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ORIGINAL ARTICLES.

THE ORIENTAL EUNUCHS.

BY EDMUND ANDREWS, M.D., LL.D.

PROFESSOR OF CLINICAL SURGERY IN THE MEDICAL DEPARTMENT OF THE NORTHWESTERN UNIVERSITY. CHICAGO, ILL.

The word eunuch is Greek and derived from εὐνη and ἔχων, literally having charge of the bedchamber, i. e., a chamberlain. In Hebrew it was *Saris*, meaning mutilated; probably because the first royal chamberlains were castrated men. However, men officially called eunuchs soon began to be employed in all sorts of offices, though many of them were really not such in the surgical sense, and the word became merely equivalent to the term officer. A figure of speech also crept into use in which certain persons for religious reasons are said to have "eunuchized" themselves, who, in the opinion of commentators, underwent no mutilation, but merely lived in total celibacy, like eunuchs, as in the third class mentioned in Matthew, 19, 12. This habit of broadening the definition of words at the expense of their precision is a linguistic trait of oriental countries. The people were very fond of this figurative and hazy use of language; greatly to the perplexity of young western scholars, accustomed from childhood to the clean-cut precision of English definitions.

EFFECTS OF CASTRATION ON ANIMALS.

It will facilitate our study of human eunuchism if we first consider the effects of castration in the lower animals.

The elk.—The finest investigation ever made on this animal was carried out by the late Judge Caton, who had a deer park at Ottawa, Ill. He possessed there a considerable herd of the *Cervus Canadensis*, commonly called the American elk, though strictly speaking it is not a true elk at all, but a very large deer, like the English stag. Two of the males became dangerous from their fighting propensities, and one of them killed a man who had wandered into the park. The Judge had them castrated to reduce their pugnacity, and for two or three years observed the effects on their horns.

The course of horn growth in the uncastrated buck is this: Their so-called horns are not composed of real horny material, but of true bone, and are developed into antlers of immense size. They are shed annually, as in all the deer tribe. During the spring and summer they grow rapidly. They are then covered with skin, hair and connective tissue, and supplied with numerous large arteries and veins running between the bone and the skin. This is the stage called "the velvet." Toward autumn a narrow knobby ridge, or ring of bone, like a narrow provisional callus begins to develop around the base of each horn, which ridge pushes out and presses hard against the nutrient vessels supplying the horn, and in some weeks obliterates them. Then the velvety skin and connective tissue covering the antlers is cut off from nutrition and dies. The bony horn itself also dies later and the dead skin dries and becomes loose, and the animal rubs it off among the trees and bushes, leaving the superb antlers in their perfected condition. The antlers now have no nutrition, except a little derived from the small interior vessels of the cancellated tissue, which are soon obliterated. They are now two immense necrosed bones and in the course of the winter undergo a separation, like any other necrosed bones, and drop off. In the spring a new pair sprouts and develops, like their predecessors. Judge Caton found that if while the young horns were in the velvet the buck be castrated the pair of horns then developing would go on, finish their growth and be shed the following winter as usual, but the next pair were never shed. The effect of the castration is to prevent the formation of the bony ring at the base. Consequently the blood vessels are not obliterated, the horns continue in the velvet, they do not die and are not shed. In our climate however the severity of the winter freezes the antlers and kills them down to a point perhaps eight inches from the skull. The frozen parts ultimately drop off and in the spring numerous small horns, like fingers, sprout up from the stumps. The next winter these are partly frozen, and so on until a pair of large knobby bunches of bone stand up on the top of the head.

So far as I know, no one has ever tried protecting these horns from the winter's cold to see what they would grow to. They would probably attain an immense size.

The ox.—When a calf is castrated he grows to be a larger and taller animal than the bull, but his neck and forequarters are thinner. His cerebellum becomes larger than that of the bull and his horns become both thicker and longer. The voice is changed in pitch while "lowing," but not while "bellowing." There are only three words, so to speak, in the bovine vocabulary: 1. The "low," with which they call each other at a distance. 2. A rough purring, which is used in speaking to each other near by and is made by a slight vibration of the vocal cords with the lips closed; it is especially used by the cow to the calf. 3. The "bellow," which is a growl of defiance.

The change of pitch caused by castration affects only the distant call in "lowing," and affects it in a directly opposite way from the voice of the human eunuch. In the latter the voice remains soprano, as in a boy or woman, while in the adult bull the voice in lowing is an octave higher than that of the cow. The ox retains the pitch of the cow's voice; but the lowing of the young bull rises a full octave when he comes to the age of puberty. The type of sound reminds one of the high falsetto voice sometimes

forced out by an untrained bass singer trying to reach a high note.

The horse.—These animals grow larger of frame if castrated young. The voice and the "bridle teeth" do not seem to be changed.

The sheep.—The "wethers," or castrated sheep do not become strikingly larger. The wool of the ram is, however, much more oily than that of the wether, the little yellow drops of oil (called lanolin in pharmacy) being very abundant, so that wool buyer's make a deduction from the price paid for rams' wool on account of the increased weight caused by the oil—or lanolin.

The cat.—These animals grow larger if castrated and are excellent mousers. They take great pains to display their hunting trophies, seeming to take a pride in them and desiring to be petted for their exploits. The voice is not changed.

The squirrel.—Naturalists state that black or gray male squirrels in fighting seek to castrate each other with their teeth, so that many of those taken by hunters are thus mutilated. As they do it only in adult life it does not materially change their general development.

The capon (castrated chicken).—These birds grow to a large size, being 50 per cent. heavier than the full-grown cocks. The flesh is delicate and very tender. Their spurs remain undeveloped, the colored comb and wattles about the head remain very small and the gay ornamental plumage of the cock is mostly wanting Veterinary surgeons assert that capons develop a remarkable nursing instinct and that some of them will take care of a brood of chickens better than a hen.

In general terms, if an animal is castrated young he develops the distinctively male peculiarities in only a slight degree, yet some species produce much larger horns than the perfect male. The ox and the gelding do not completely lose their sexual passion, but make frequent efforts to copulate with females in heat. We will discuss the mental and physical effects on men a little further on.

EUNUCHS IN NINEVEH.

The recent excavations in the ruins of Nineveh, made by Layard and his successors have brought to light many sculptured figures of eunuchs in the retinues of the kings of Assyria. Several palaces were examined and immense numbers of bas-reliefs and inscriptions recovered. These palaces were erected at different periods not very far from 800 B.C. The portals were decorated with colossal winged bulls, and lions with human heads, while the halls and apartments were lined with immense numbers of large bas-reliefs cut on slabs of alabaster; showing historic sieges, battles, hawking excursions, deer hunts, lion hunts, scenes of worship, trains of captives and of spoils taken in war, etc. The Ninevites patronized the hairdressers to a surprising extent, and the sculptors fairly revelled in the elaborateness with which they copied, in stone, these hirsute adornments. The hair, both of the scalp and of the face, was combed neatly in the center, but elaborately waved, crinkled and curled all about the margins in a way that would excite the wonder and envy of any modern dude. The very manes and tails of the horses were treated in a similar way, and also the tufts of hair on the tips of the tails of the colossal winged bulls. Here and there along the sculptured processions, in strong contrast to the bearded men, the eunuchs stand out with their smooth, beardless faces, fat cheeks and bald double-chins. The artists adopted these features as a conventional mode of representing them. They are quite numerous in the royal retinues, and not confined to any particular rank or department of service. They are figured as cooks in the royal kitchen, musicians, personal attendants on the king, cupbearers, foresters, gamekeepers, sword-bearers, military commanders and civil officers of high rank. In the Hebrew scriptures of this same period one of the three high officers sent by the King of Nineveh to demand the surrender of King Hezekiah, is called Rab-Saris, *i. e.*, Master of the Eunuchs (2 Kings: 18;17). At a later period the King of Babylon deputed the "Master of Eunuchs" to select from the captive Hebrew families a number of children to be brought up in the palace, probably as eunuchs and future officers of the royal retinue in Babylon. Daniel, the prophet, is designated as one of these children, and has often been believed or inferred to have been himself an eunuch, though that fact is not explicitly stated, and high Hebrew authorities disbelieve it.

THE PERSIANS.

The great historian, Xenophon, says that eunuchs in Persia were held in such high esteem that they filled offices of the greatest rank and responsibility.

Herodotus, a still earlier writer and called the "Father of History," says the Persian kings prized them most highly for their faithfulness, and entrusted them with the highest offices.

THE HEBREWS.

Eunuchs appear to some extent in the Hebrew records, under the name *saris*, but the term soon partly lost its primary meaning of "mutilated" and became shaded off into the general signification of "officer" whether the person referred to was surgically an eunuch or not. Thus in the story of Potiphar, he is called a "saris," but still he is said to have had a wife. Jewish scholars of high authority think the word had already acquired a secondary meaning, just as in modern armies there are grenadiers who never saw a grenade, and brigadier-generals who never commanded brigades. Kremer says that in modern times there have been actual eunuchs who took wives presumably for the regulation of their households, the government of their female servants, and for the dignity and comfort of a home life.

In Deuteronomy, xxiii; 1, two mutilations analagous to those of a "complete" castration are mentioned, but not as in the same person (a castration is called "complete" when both the testes and the penis are removed). The English version says: "He that is wounded (Hebrew, squeezed or crushed) in his stones, or has his privy member cut off (Hebrew, torn out) shall not enter into the congregation." Jewish commentators understand this to mean that he can not legally marry a Jewish woman.

The "Talmud," which is the literature of the rabbinical schools from 200 B. C. to 400 A. D., mentions both castration of the testicles and the mutilation of the penis. The Hebrew historian describes a successful insurrection headed by Jehu against King Joram and his mother, the talented and forceful Queen Jezebel or Izabel, as the real name probably was, for the English sound of J did not exist in the Hebrew alphabet. The account states that several eunuchs in the queen's palace sided with Jehu (2 Kings: 9; 32). This Izabel, whatever the pronunciation of her name

may be, was a Phœnician princess when she married King Ahab, and probably brought the eunuchs with her from Tyre as household servants. Some oriental scholars think that the name Izabel or Isabel, being common in Phœnicia, first went westward with the emigrants from Tyre who founded the city and colony of Carthage, and thence went with the Carthaginians to Spain. There it became a favorite name and at a later period spread all over Christendom, few persons recognizing its identity with Jezebel. Eunuchs are occasionally mentioned in other parts of the "old testament," but in fully half the cases it appears to be in the secondary sense of "officer." The moral sense of the people seems to have been averse to their production and they never became a prominent factor in the government.

ANCIENT EGYPT.

Some Egyptologists doubt whether eunuchs regularly existed in ancient Egypt until the invasions of the Persians and the Babylonians. Professor Breasted of the University of Chicago says, there is some difficulty in identifying eunuchs in the bas-reliefs and mural paintings of Egypt because of the prevalent fashion of shaving, which prevents the absence of a beard in a figure from being any positive proof of castration. Further, he thinks the mural decorations show that in early times the women were not secluded, but had great social liberty, so that there would be little demand for eunuchs. Rosellini, however, claimed to have found them on the monuments, and Lepsius (II. 126) gives a picture of two of them copied from a tomb at Beni Hassan, clearly showing their condition by their beardless and fat countenances. Further, the sacred "Book of the Dead" (xvii, 26) represents the good god Horus, as tearing out the testicles of his enemy, the evil god, Set; while Plutarch, in "Isis and Osiris" (55) says that in Koptos, in Egypt, Horus was pictured as holding in one hand the penis which he had cut off from the god Set. These quotations show that the Egyptians knew of both steps in the operation of "complete castration," and supposed that Horus made a "complete" eunuch of Set. This myth reminds one of a somewhat similar story among the ancient Greeks, that the god Chronos castrated his father Ouranos, performing the operation with a sickle made of diamond.

MORE MODERN TIMES.

As long as the Roman power remained confined to the Italian peninsula we do not find any conspicuous employments of eunuchs, though they doubtless appeared there to some extent on the Phœnician and Carthaginian trading vessels, but as the imperial power spread eastward it began to be permeated with these intriguing agents of orientalism. Among the earliest of these immigrants were the priests of the goddess Cybele, from Asia Minor, who were required by their religion to be eunuchs. In process of time various talented eunuchs exerted great influence in the affairs of government. One of them named Hermias became governor of a province in Asia Minor. The great philosopher Aristotle celebrated the fame of this Hermias in a poem which is still extant, and offered sacrifices to his manes. In the "New Testament" (Acts, 8: 27) mention is made of "an eunuch of great authority under Candace, queen of the Ethiopians."

While the capital of the Roman Empire was at Constantinople, under the Emperor Justinian, an eunuch named Narses, born in the Armenian part of Persia, arrived and took service under the Emperor, where he gradually attained very high rank and influence. After a series of years an insurrection broke out in Constantinople which the imperial guards and troops were unable to suppress. Narses, backed by a large sum of money, got interviews with the leaders, bought them up, and by his skill and adroitness put an end to the whole trouble. Some time later the Goths overran and conquered nearly the whole peninsula of Italy. After many failures by the Roman generals, Narses was put in command of the army, and in two campaigns he drove the Goths completely out of the peninsula. This occurred in the years 552–553 A. D. He proved himself a military commander of great energy and talent. Narses was not the sole example of executive capacity among his class. There were frequent occasions when the eunuchs were all powerful at the imperial court both in Rome and in Constantinople. (*Grand Dictionnaire Universelle du XIXe Siècle*).

THE POSITION OF THE CHURCH.

Very early the church authorities began to discourage the barbarity of castration, but individuals to some extent favored it. The Patriarch of Alexandria was annoyed in the third century by a small party of fanatics named Valesians who defied his authority, and taught that castration was necessary to salvation. The celebrated Christian writer, Origen, born about 185 A.D., who was the first strong intellect to reduce Christian doctrines to something like a philosophic system, conceived that his usefulness would be greatly increased if he were an eunuch. He therefore caused himself to be castrated, which act he greatly regretted in after life. The Patriarch of Alexandria disapproved of it, and refused to admit him to the priesthood. Origen then went to Palestine, where the Sub-Patriarch of Jerusalem admitted him. Origen afterward founded a very celebrated Christian school or seminary.

At Constantinople there seems to have been no prevailing objection to eunuchs, for Nicetes, Photius, Ignatius and Methodius, all eunuchs, were made Patriarchs. However, the general sentiment grew steadily stronger against these mutilations until in 325 A.D., the celebrated Council of Nice prohibited the admission of any more eunuchs to the priesthood. The practice of making eunuchs, however, never fully died out from the laity, and when the Mahommedans conquered all the territories of the Eastern Empire they gave a tenfold impetus to the nefarious business of mutilating children to produce harem guards.

In Italy the Mahommedans got no permanent foothold, but a small clandestine business had existed ever since pagan times of making male soprano singers by castrating boys before the change of voice, which occurred at puberty. These male soprano singers were bought at high prices or employed in the opera houses and in some churches. Some of the popes forbade their admission to church choirs, but the underclergy did not fully obey them. Even down almost to the present time they were employed in the Vatican choir at Rome, but the present pope early in his reign put an end to the scandal and forbade the further use of eunuchs in the Vatican choirs. This prohibition, combined with the public sentiment of Italy has pretty well extinguished the infamous business, though Italian physicians say that a few

eunuchs are still clandestinely made in defiance of law.

In the Turkish Empire most of the eunuchs are furnished by the monastery called Abou-Gerhè in upper Egypt, where the Coptic priests castrate Nubian and Abyssinian slave boys at about 8 years of age and afterward sell them to the Turkish market. Turks in Asia Minor are also partly supplied by Circassian eunuchs. The Coptic priests before mentioned perform on the stronger part of the children what is called the "complete" operation. That is, they cut away the whole scrotum, testes and penis. The mortality of the operation is said to be very great. Clot Bey, chief physician of the Pasha, said that only one in three survived. Chardin stated that only one in seven survived. Dr. Dadirrian of New York, who practiced thirteen years in Constantinople, says he had no means of ascertaining the mortality during his residence in Turkey. Owing to so many dying on their hands, the survivors have to be sold at very high prices to cover the loss. This large proportion of deaths shows gross surgical ignorance and incompetency and the technique of the operation, unless recently improved, is very barbarous. I presume aseptic measures are among the things unknown in that quarter.

In Hindustan eunuchs are abundant among the Mohammedans of the Northwest provinces. A physician who had lived there did not think that they were common among those of other faiths. However, the *Indian Annals of Medical Science* reports them as numerous in Southern India, where they are called Kojahs.

In China eunuchs have existed for ages. The emperor has a retinue of them, which if full would number 3,000, but as a fact there are at present only about 2,000. They perform the work of the household and are divided into forty-eight classes under proper officers. All the emperor's sons and sons-in-law are obliged to keep from thirty down to four eunuchs each. Most of these servants were castrated by their parents (not always poor) between the ages of four and eight years, because it insures the children a career in which they can get a good living (Williams' "Middle Kingdom," Vol. 1, pp. 407–8).

Russia.—There are large tribes of Mahommedans in portions of Russia whose higher classes employ eunuchs, considerable numbers of whom are sold, or at least sent into Turkey, where also many Circassian marriageable girls find homes in the harems. Among the Russian Christians a secret sect or society has lately been discovered who clandestinely practice castration. They are called *Skopzi*, a word which signifies castrated.

Australia.—Reputable authors assert that the wild natives limit the increase of families by crushing the testicles of the father after his first child is born. I have not been able to verify this assertion. The plan of crushing the testicles coincides with the "squeezed" testes mentioned in Deuteronomy: xxiii; 1, and marked with disapproval by exclusion from the congregation.

PHYSICAL EFFECTS OF CASTRATION IN MAN.

Eunuchs made such in childhood grow taller and have larger frames than average men. They are also fatter. The hair of the pubes and of the face does not grow. The result is that the cheeks are round and prominent, the chin is apt to be double, and there is no beard. Those in whom the penis is removed use a tube to assist micturition. This is probably for two reasons: 1. To convey the urine clear of the person and of the clothing; 2, to prevent the contraction of the cicatricial orifice, which, unless attended to, is in some patients prone to form a stricture. It is thought that eunuchs, like women, are less subject than men to the occurrence of stone in the bladder, and when old they are doubtless all free from senile hypertrophy of the prostate gland.

The effect on the voice.—A boy's voice below the age of puberty is at about the same pitch as that of a woman, but as puberty comes on "the voice changes," that is, it lowers its pitch as the vocal cords and the larynx enlarge, and in about two or three years is found an octave lower than that of the woman. Hence it is a favorite practice in some churches to have boys instead of women to sing soprano and contralto, and to those who care only for the pitch and not at all for the "timbre" of the voices the result is fairly good, but trained auditors are not fully satisfied. I have listened to some of the best boy choirs in this country and Europe, who rendered the pitch perfectly, but the quality, the timbre as it is called, never attains the richness and flute-like splendor found in the adult woman. The fact is the boy's voice is never a true soprano. If a vocal teacher of a large class will separate the boys from the girls and have them sing alternately he will instantly perceive that the girls sing in a flute-like tone, while the boys' voices have a slight clarionet quality, a kind of vibrant character, the forerunner of the trumpet note of the coming man's voice. Eunuchs preserve the high pitch of the boy's voice and often make effective singers, but yet it is the vibrant boy tone, a voice slightly mixed with the reedy clarionet timbre. There is no truly pure and glorious soprano to be had on earth except from a woman's voice. Yet some of the eunuch vocalists were very fine. Those who heard the Vatican choir some twenty-five years ago may remember a stately, almost gigantic, eunuch soprano with a voice of great sweetness and tremendous power. Still it was vibrant and not a pure flute tone, but it was excellent. He was probably the last of his kind to lift up his voice in the Vatican.

MENTAL EFFECTS OF CASTRATION.

I have not found in ancient writers any tendency to stigmatize eunuchs as feeble-minded, but modern authors indulge in the most absurd and contradictory statements on this subject.

The effect on sexual desires.—Some writers assert that if castrated young the eunuchs remain perfectly indifferent to female attractions, and articles are often written in medical journals advocating the castration of sundry criminals in adult life under the assumption that their sexual temptations will all be removed by the simple ablation of the testes. The Turks, however, have no confidence in that kind of moral reform. They require that their eunuchs shall be castrated in childhood, and that the operation shall remove scrotum, testes and penis all at one fell sweep. The Roman poet, Juvenal, alleged that in simple castration of the testes the eunuch, excited by "soft kisses," could still obtain an erection and gratify his desires, "without there being any necessity for an abortion afterward" (Satire vi, 366).

The fact appears to be that men castrated in adult life often retain a troublesome amount of sexual desire, and that even if it is done in childhood there is by no means a total absence of it, though it is much lessened.

Moral qualities.—Here come in a host of contradictions by careless observers. The Persians, Assyrians and Romans evidently entrusted the highest responsibilities to their eunuchs with success, which implies that they were not at that time weak, deceitful and corrupt beyond other men, as those of Turkey are now accused of being. I suspect the difference in training had much to do with the contrast in results. According to the book of Daniel, the king of Babylon sent the chief of the eunuchs to select boys from the best of the families of his captives. They were removed to the royal palace and apparently supported, educated, trained and carefully brought up to become counsellors and officials of the empire, and if any or all of them were made eunuchs, they might be expected to be very different from the Nubian negro boys now bought and castrated for market by the Coptic priests. However, I have not been able to ascertain what degree of training and culture is actually given to these young negro eunuchs. "Le Grand Dictionnaire Universelle du XIXe Siècle," says of them: "They get ahead by servility and not by talent." The "Cyclopedia of Religious Knowledge" says: "Eunuchs are jealous, intriguing, shameless, peculiarly subject to melancholy, and many commit suicide." Smith's "Dictionary of the Bible," in the article on eunuchs, says of them. They are full of "a blind, malignant jealousy. They are defective in courage, gentleness, shame and remorse, and develop malice, melancholy and a tendency to suicide." The "blind malignant jealousy" attributed to eunuchs seems absurd. Of all men in the world, why should an eunuch be jealous?

Dr. Dadirrian of New York, a highly educated Armenian physician, who practiced thirteen years in Constantinople, and knows many eunuchs, says: "To my knowledge they are brave, faithful and accurate in their duties. The Chief Eunuch can always communicate with the Sultan personally and is held almost equal to the Grand Vizier. The eunuchs' position is always very high and the ladies of the harem treat them very kindly. They are melancholy, not from ill treatment, but because they feel their isolation and deprivation of manly enjoyments." Dr. Dadirrian says that the common statement that they are malignantly jealous is an amusing blunder of western travelers, who do not understand the laws and etiquette of Constantinople. The truth is this: When any of the ladies of the harem go out to ride, one or more eunuchs go with them as protectors, sometimes on horseback, sometimes on foot. Now in Constantinople it is a serious insult to any royal lady, and through her to the Sultan, to stare intently at her in passing. The eunuch's official duty is to protect her from that or any other insult by instantly attacking the offender, whom he may beat or even kill, and no questions will be asked. Western travelers seem to have supposed him to be actuated by "malignant jealousy." The fact is there is no more personal jealousy in him than there is in a paving stone. He is simply doing his official duty as a harem guard, and he takes pains to execute it with such an appearance of alertness and force as will satisfy any imperial spy that may be watching him that he is an officer who understands his business and guards his ladies with what a Yankee would call "vim and snap." By continuing to do this he hopes to stand well at the palace as a protector of the ladies and to obtain future promotion.

The modern eunuchs grow up and live in a very bad moral atmosphere, but so far as I can unravel the contradictory statements about them I conclude that if we except their weakened sexual emotions, their powers of mind are as strong and their morals as good as those of other men brought up under similar training and surroundings.

In gathering such of the above facts and references as are derived from the monuments and dead languages of the far East, I am indebted to the kindness and assistance of the Rev. Simon J. Pherson, D.D., Rev. Emil G. Hirsch, Ph.D., LL.D., Professor Carrier of McCormick Seminary, and Professor Breasted of the University of Chicago.

3912 Lake Avenue.

SYPHILIS.

A Clinical Lecture to Members of the American Medical Association, Delivered in the Medico-Chirurgical Hospital of Philadelphia.

BY JOHN V. SHOEMAKER, M.D., LL.D.

PROFESSOR OF SKIN AND VENEREAL DISEASES IN THE MEDICO-CHIRURGICAL COLLEGE AND HOSPITAL OF PHILADELPHIA.

PHILADELPHIA, PA.

I have present today several well marked examples of constitutional syphilis. I bring them before you not because they are rare types, but because they collectively represent some of the most characteristic phases of the disease.

MACULAR SYPHILIDE.

This young man, 22 years of age, contracted a chancre three months ago. The period of incubation was sixteen days and the lesion lasted three weeks. Nine weeks and a half after inoculation, having regarded himself in the meantime as entirely well, he noticed that his hair came out when he used the brush. He also found a few small scattered papules upon his scalp. The hair has continued to fall and is now quite thin. The papules are of a coppery color. Upon his back and sides I observed what the patient had not yet detected, viz., a macular eruption. There have been no osteocopes or noticeable fever. His throat has felt sore for several days past. The mucous membrane is erythematous and there are two or three minute erosions.

This case illustrates several points in connection with syphilis. The manifestations are mild, they have existed but for two and a half weeks and there is a a distinct history of infection. An admitted exposure followed sixteen days later by a single sore upon the penis, the presence of small, hard and painless inguinal enlargement, loss of hair, an eruption upon the skin and soreness of the throat can signify nothing else than syphilis. The sore upon the penis was undoubtedly a chancre. Yet he tells me that after the lesion was healed he thought that he was completely cured. He was not aware that there was any relationship between the chancre and secondary outbreak. He had not perceived the exanthem. Now, unless he be sufficiently instructed as to the beginning and persistent nature of the malady which he has unfortunately contracted, and submit himself to a thorough, systematic prolonged course of treatment, he will be subject to frequent relapses and become a menace to every one with whom he is brought into intimate contact. On the contrary, if after its importance is explained to him, he will faithfully regulate his habits and conform to instructions, the present manifestations will rapidly disappear and he will eventually be cured.

The predominant rash upon the body is macular,

but the polymorphous character of syphilis is shown by the coexistence of small papules upon the scalp and shoulders. He has come to us in good time. In a few days without treatment the erosions of the mouth would become distinct syphilitic ulcers. He shall be warned as to the manner in which he might communicate the disease to innocent persons, and be placed at once upon the protiodid of mercury. As he is a robust individual I shall combine with the specific the tartar emetic and a small dose of powdered opium, as:

℞ Antimonii et potassii tartratis. . . . . gr. v. | 32
Hydrargyri iodidi viridis . . . . . |
Pulveris opii . . . . . āā gr. xv. | 96
M. et ft. pilulæ No. LX. Sig.—One pill three times daily.

The antimony favors the action of the mercurial and the opium restrains its influence upon the bowels. At the end of a week the patient shall be directed to take a fourth pill at bed time. At the end of three weeks the tartar emetic shall be discontinued and the green iodid be given continuously for three or four months. At the expiration of that period if no manifestation of disease are present the drug may be advantageously suspended for two weeks, or at least given in diminished doses, as one-sixteenth grain twice a day. The full dose is then resumed for another period of three or four months. After the lapse of a year the specific may be discontinued for a longer interval. In this manner by promptly producing a decided mercurial impression and subsequently suspending or diminishing treatment during stated intervals, the virus of the disease will in most cases be totally eradicated by the end of the second year. The opium need not be continued uninterruptedly. Some writers deprecate its use and advise a combination with tannic acid or the administration of mercurious tannate. A small dose of opium, however, will prevent intestinal pains as well as check diarrhea.

When mercury is given in this guarded manner it seldom excites ptyalism. A serviceable precaution also to observe in this connection is scrupulous care of the patient's mouth, which should be frequently cleansed with mild astringent and antiseptic mouth-washes.

The form in which the mercurial is given is of minor importance provided that enough be absorbed to antagonize the disease. The tiny ulcers within the mouth may be effectively touched with solutions of nitrate of silver, nitrate of mercury or sulphate of copper of suitable strength. The patient should abstain entirely from tobacco and alcoholic liquors. A stimulant hair tonic will facilitate the return of the hair. All local treatment, however, is simply accessory.

MACULAR AND PAPULAR SYPHILIDE.

A second man, 23 years of age, exhibits an abundant, symmetrical, copper colored, polymorphous rash upon the trunk and limbs. There is a predominance of small papules, but macules, large papules and pustules are also present. Prior to the evolution of the rash the man suffered from headache and aching pain over the upper part of the sternum. He has of late lost eighteen pounds in weight. He has a sore throat of the erythematous type. The patient contracted a chancre two and a half months ago, and the sore was treated at that time in our dispensary service. The eruption has been present for about five weeks. There are enlarged glands in each groin. The rash is attended by some itching, especially in the evening. Absence of itching is given as one of the diagnostic signs of a syphilide, but the rule, though general, is not absolute. From time to time I meet with a case of itching syphilide.

This case is of some individual interest in contrast with that of the first patient. In both instances the infection dates from nearly the same time. The disease, however, has made more rapid progress in this case, probably owing to the social conditions and habits of the young man. Though the small papular syphilide develops not much later than the macular, yet the large papules and pustules usually belong to a later period. When pustules occur early in the course of syphilis they generally indicate decided constitutional depression.

The treatment of this case will be conducted upon the same principles as the first. A mildly astringent gargle will be ordered, not as having direct therapeutic value but for the reasons already given. On account of the progress which the disease has made I will make use of the corrosive sublimate, as:

℞ Hydrargyri chloridi corrosivi . . . . . gr. iij | 20
Glycerini . . . . . ʒ j | 32
Syrupi sarsaparillæ compositæ. . . . . ʒ iij | 96
M. ft. sol. Sig.—Teaspoonful three times a day.

TUBERCULAR SYPHILIDE.

A young man, 24 years of age, entered the hospital on account of a tubercular eruption which has affected a large part of the body for the last two years. The lesions began upon the face and at first were small. They are at the present time of various sizes, solid and semisolid in consistence. Many of them have broken down to form ulcers and a number of cicatrices are seen upon the face. In other places the eruption is in more active progress, ulcerated lesions appearing upon the surface.

This case differs altogether from those which I have already brought before you today. The man professes, and I see no reason to doubt his word, ignorance of the manner in which the disease was acquired. The lesions have been steadily growing worse for some time and cause him great distress of mind. He is extremely anxious to be cured and perfectly willing to throw all the light he can upon his case. However, he knows nothing of its origin. At his age the history can not be obscured by the mists of time. In old "rounders" of forty and more, who have pursued a course of venereal alcoholic dissipation, in whom syphilis has never been cured but recurs in various guises from time to time, we often fail to obtain any definite history of the origin. Chancre, chancroid and mucous patches have upon different occasions involved the virile organ. It is almost a hopeless task to endeavor to distinguish an orderly and characteristic sequence of events. Tubercles, rupia and gummata point nevertheless to a syphilitic origin. We feel that we can make no mistake in adopting specific combined, it may be, or alternating with tonic treatment. Here, however, we have a patient in the flower of youth as far as mere years count. It does seem strange, indeed, that there is no reminiscence of primary disease. The man has been an industrious mechanic and has not been given to sexual excesses.

If I have seemed to assume the diagnosis it is because I have already had the opportunity of convincing myself of the nature of the malady. In fact what other disease than syphilis could cause such lesions? It is possible to form an opinion by exclusion. Tubercular lesions are common to syphilis, lupus vulgaris, lepra, carcinoma and certain rare forms of cutaneous

disease which need not here be taken into consideration. Leprosy need not long engage our attention. A stray case is now and then seen in Philadelphia, it is true, but the patient is a foreigner or one who has lived abroad. Leprous tubercles grow more slowly than those of syphilis, occasion a more hideous deformity, and moreover are characterized by more or less anesthesia. Lupus vulgaris generally begins before the twenty-second year, the tubercles are small and soft; the ulcer of lupus is superficial as a rule, and the scales are thin. Rarely in lupus should we see so disseminated an eruption. Cancer may be thrown out of question on account of the youth of the patient, the number and distribution of the lesions.

The diagnosis established, the next point concerns the treatment. The tubercular eruption belongs to the tertiary stage. As a general rule it is benefited by the administration of the corrosive chlorid of mercury combined with potassium iodid. There are, however, cases now and then encountered which prove unamenable to such a course. In such instances I have often derived benefit from the use of vegetable alteratives and tonics given until the secretions have improved. The specific treatment can then be resumed with greater advantage. In this case I shall adopt, provisionally, the method which is ordinarily attended by success, and prescribe:

℞	Hydrargyri chloridi corrosivi	gr. iss	10
	Potassii iodidi.	ʒ iij	12
	Syrupi zingiberis	ʒ j	32
	Aquæ	ʒ iij	96

M. ft. sol. Sig.—Dessertspoonful three times a day.

MOIST PAPULES.

In a fourth patient, likewise a male, 25 years of age, syphilis displays itself principally upon the mucous membrane of the mouth, leaving the skin almost intact. There are a few papules and pustules upon the back, and presumably from the man's somewhat indistinct account there has been a generalized eruption. He has been afflicted with sores in the mouth and upon the tongue for the last three months. There is no history of primary disease. He is not conscious of ever having had a chancre, but about a year ago he suffered from an attack of gonorrhea. Coincident with the attack the inguinal glands enlarged but did not suppurate. Shortly afterward he lost much of his hair and also had sores in the mouth. It is probable that he had a urethral chancre coexistent with the gonorrhea. At all events the history is well nigh conclusive as to syphilis infection, and it is strongly corroborated by the clinical evidence. Upon the roof of the mouth is a typic mucous patch, and ulcers are seen upon each side of the anterior half of the tongue extending nearly to the tip. There are also one or two just within the angle of the mouth. The moist papule, mucous papule, mucous patch or condyloma, for it is known under all of these names, is the analogue of the large flat papular or lenticular syphilide. Under the influence of the heat and moisture of mucous cavities this lesion is modified in its aspect and mode of growth. It flourishes within and around mucocutaneous outlets. The term "mucous patch," by which it is perhaps most generally known, is appropriate, inasmuch as it is frequently due to the coalescence of adjacent papules. Around the outlet of the anus and vagina these lesions may assume large proportions and a most repulsive appearance.

I have said that upon the roof of the mouth is a typic mucous patch. Now a mucous patch is characteristic only of syphilis. It occurs in no other disease. Nor is it usually difficult to recognize. This lesion is generally raised a little above the level of the surrounding surface, though in some cases it is depressed. Moist papules are soft and smooth; sometimes they are of a deep red color and again they are grayish, as if the surface had been touched with nitrate of silver. They are sometimes the seat of luxuriant papillary outgrowths. Mucous patches may develop between the toes, in the groins and about the umbilicus.

This lesion is one of the most constant of syphilis. It exhibits an inveterate tendency to recurrence. Long after all marks of the disease have disappeared from the skin we may, to our disgust, witness the return of the mucous patch. So notorious is this characteristic that Jullien, with that epigrammatic terseness so highly valued by French writers, and which is so emphatic, declares the average course of syphilis to consist of a chancre, a macular rash, mucous patches, relapses of mucous patches, more mucous patches.

The same disposition to recur is seen in the small ulcers so common in the mouth during the secondary period. Much of this obstinacy depends upon irritation due to tobacco, alcoholic drinks, and carelessness in the toilet of the mouth.

Another peculiarity makes the mucous patch remarkable among the lesions of syphilis. Next to the primary infecting sore, the chancre, it is most responsible for the spread of the disease. It is the great source of extra-genital syphilis. Innocent embraces and lascivious dalliance alike spread infection when mucous patches are present in the mouth.

Local treatment expedites the cure of mucous patches or rather, I should say, their suppression, for they are never entirely cured until the disease which produced them is extinct. Solutions of silver nitrate, copper sulphate and mercuric nitrate are among the most justly prized applications. The official solution of mercuric nitrate, diluted with eight to twelve parts of water is often of speedy benefit, and I will make use of it in this case. In advanced secondary syphilis Gibert's syrup is an excellent remedy. This combination consists of the red mercuric iodid or biniodid, together with potassium iodid. It may be thus ordered:

℞	Hydrargyri iodidi rubri	gr. j	06
	Potassii iodidi	ʒ ss	16
	Aquæ destillatæ	ʒ ij	8
	Syrupi	q. s. ad. ʒ vi	196

M. ft. sol. Sig.—Dessertspoonful three times a day.

This patient shall be forbidden to use, above all to chew, tobacco. He should also avoid spiritous liquors. Every subject of mucous patches should be informed of the danger that he may spread the disease by kissing, common use of table utensils, etc.

In unusually obstinate or in "galloping" syphilis we may advantageously have recourse to other methods. Our aim being to saturate the blood rapidly with the antidote we may have recourse to mercurial inunction or to hypodermic injections. The former procedure is no doubt efficacious, but it is in many respects inconvenient to carry out in private practice. Hypodermic injections are cleanly and avoid the publicity which is so apt to attach to inunction. A host of mercurials have been recommended by different writers. I have had a large experience with this method of treatment and believe that no preparation surpasses the bichlorid in efficiency. I dissolve 4 grains of corrosive chlorid in an ounce of water and

inject 5 minims of this solution, increasing the dose minim by minim every second or third day until improvement or a constitutional effect of the mercury occurs.

SOME OBSERVATIONS ON THE TREATMENT OF TABES DORSALIS.

BY DANIEL R. BROWER, A.M., M.D.

Professor of Mental Diseases and Therapeutics, Rush Medical College; Professor of Nervous Diseases Woman's Medical College (Northwestern University); Professor of Mental and Nervous Diseases, Post-Graduate Medical School.

CHICAGO, ILL.

The treatment of any disease, as a matter of course, is largely based upon its pathogenesis; and while we may safely assume that at least 90 per cent. of the cases of tabes dorsalis have an antecedent syphilitic history, yet it is not a true syphilitic disease, for in the remaining percentage of cases other etiologic factors are at work, among which are trauma, the acute infections, alcoholism, and the auto-intoxications, so that we may call the disease rather a degenerative sequela of these various processes, and we know not whether the disease begins in the neurons, in the connective tissue, or in the blood vessels. But let it begin where it may, the resultant is a sclerosis terminating in hypertrophy of the connective tissue and a destruction of the sensory neurons of the spinal cord. I am of the opinion that with many a too gloomy prognosis is made. In my experience the arrest of the disease is not infrequent, when the treatment is commenced in the pre-ataxic stage, and considerable improvement is possible even when the second and third stages of the disease have been reached prior to its commencement. The disease does not always interfere with the very successful use of the inherent powers of the patients. I have one patient who, since the pre-ataxic stage began about twenty years ago, has carried on a large manufacturing concern, employing at times several hundred men, and has accumulated a large fortune. I have another patient who, since the disease began about fifteen years ago, has attained eminence as a lawyer and as a politician, and has been the Governor of a great State, and is still in the active pursuit of his profession.

Treatment.—The first consideration in the treatment is the climate, and whenever it is practicable, as it often is in a great country like the United States, a warm, dry, equable climate of low level or moderate altitude should be selected as the place of permanent residence for the patient.

If the case is not advancing rapidly, an ocean voyage, giving the maximum amount of fresh air with a minimum amount of exertion, is often beneficial. I am in the habit of recommending to my Chicago patients, when possible, to spend two or three of the spring months in the Ozark Mountains of Missouri, in the mountains of North Carolina, or in a similar moderate altitude; or at Atlanta, Ga., or Los Angeles, Cal., or in similar low level climates, thus avoiding the cold and dampness and exceedingly variable climates of this season of the year in this locality.

The next important consideration is rest. When the disease is advancing rapidly, absolute rest in bed, with daily massage and the faradic exercise of the muscles is indicated, and this may often be continued with advantage for six or eight weeks, and then patients gradually resume their ordinary avocations; and in every case I think a portion of each day should be spent in the recumbent position. I advise business men to provide themselves with a lounge in their office, and spend at least one hour in the recumbent position, and in this position they can transact much business, and at the same time give rest to the spinal cord. Excessive mental work and physical fatigue should be avoided; sexual excesses are especially harmful and seem to contribute to the production of optic nerve atrophy; whatever exercise the patient takes should always stop short of fatigue. Traumas being of serious consequence, especially concussion of the spine, should be avoided with great care. The training of the muscles in the work of co-ordination, as proposed by Fraenkel, I endorse, and advise various exercises, such as he proposed, for an hour or an hour and a half daily, and it is surprising what amount of power of co-ordination will be regained by the judicious following of this teaching.

The gastro-intestinal tract demands special attention; lavage and bowel irrigation are often indicated. Gastric crises are provoked by indigestion and colonic impaction. Food, therefore, should be easily digested, and constipation should be avoided. A change of life from one of activity to one of inactivity, forced upon the patient by the disease, tends to develop gout in those who are predisposed to it, and this should be constantly borne in mind and the diet regulated accordingly. Excesses in alcoholics and in smoking should be avoided. Electricity, especially the static form, from a machine of high potential, by insulation and by heavy sparks from the spine and lower extremities, is usually of very much service. Faradization of the skin by the wire brush electrode is also beneficial. These two forms of electricity, in my judgment, are very far superior to galvanization. When the bladder or its sphincter is weak faradization of this organ is often of service.

Suspension, first brought to our notice by the Russian physician, Motschutkowski, is of service when the disease is advancing after a more or less lengthened stationary period. I am sure that it is of service, although the practice is being abandoned by a great many. Stretching the sciatic nerves by manipulation, in the same class of cases gives results somewhat similar to suspension. Cold or tepid baths at a temperature not to exceed 96 degrees F., especially with jet or shower accompaniments are useful. A hot bath, in my judgment, is often very injurious.

In those cases of tabes dorsalis in which the symptoms have developed very rapidly and the syphilitic infection is recent, vigorous antisyphilitic treatment is beneficial, and it should consist in the largest possible doses of the iodid of potassium together with the hypodermatic use of mercury. But in those cases of locomotor ataxia where the development has been slow, and where a long interval has elapsed since the primary symptoms occurred, I am sure that this form of medication often does great harm. An alterative on which I place the greatest reliance in the chlorid of gold and sodium. I think that this drug has some power in arresting the progression of connective tissue hypertrophy in the spinal cord, as well as in the liver and kidneys. I am in the habit of giving this drug in the tenth of a grain doses (.006 gram), three times a day, and usually combine it with the resin of guaiac (.18 grams). Chlorid of gold and sodium is a very unstable drug and great care should

be exercised in its preparation by the pharmacist and in its administration by the physician. It is my practice to have the drug rubbed up dry with the pulverized resin of guaiac placed in capsules, and given one hour before meals; or, in more urgent cases, I have it prepared freshly in solution and use it hypodermatically, thus hoping to avoid by the one method or the other the destruction of the drug in the stomach. This drug being a tonic, as well as an alterative, it is indicated in the several stages of the disease and may be continued with advantage for months at a time.

The next drug upon which I place reliance is a preparation of phosphorus, and for this purpose prefer the phosphid of zinc. This I give in the eighth (.008 gram) or tenth (.006 gram) of a grain doses, three times a day after meals. As a tonic and alterative, in alternation with the above I use arsenic, preferring the arsenate of sodium in about the twelfth of a grain (.0054 gram) doses, to any other of the preparations of arsenic.

When the disease has taken upon itself a rapid developmental state, full doses of ergot with the rest before indicated will sometimes stop the rapid progression of the disease. For the pains I have found that extract of cannabis indica, injections of cocain, and acetanilid alone, or in combination, are the most successful. I have seen no especially beneficial results from the use of nitrate of silver, aluminum chlorid or of mercury in ordinary cases, and my experience is emphatically against the use of strychnia in this disease. I am very confident that I have seen more than one case very greatly injured by the use of even ordinary doses of strychnia.

GUMMATA OF THE HEART IN A CASE OF CONGENITAL SYPHILIS.

FROM THE PATHOLOGICAL LABORATORY OF RUSH MEDICAL COLLEGE.

Read before the Chicago Pathological Society, Jan. 11, 1897.

BY E. R. LeCOUNT, M.D.
DEMONSTRATOR OF PATHOLOGY.
CHICAGO, ILL.

The following case is of interest as an instance of a lesion observed very infrequently, viz: gummata of the heart as a feature of congenital syphilis.

A child born at term, of young parents, died almost immediately following birth and was sent to the laboratory of Rush Medical College by Dr. A. B. Strong, of Chicago, in whose practice the case occurred and to whom I am indebted for the opportunity of making the examination.

Autopsy Abstract.—Weight 2,500 gm., length 50 cm.; the umbilical cord showed a recent ligature. The external surface of the body was the seat of a vesicular and pustular inflammation, most marked over the face, hands, feet and buttocks. The contents of these eruptions, although generally clear, were occasionally seropurulent and less often of soft, cheese-like necrotic material. The peritoneum was normal and its cavity empty. The thymus weighed 7.5 gm., and possessed several softened areas containing gray viscid pus.[1] The thyroid, submaxillary and parotid glands were normal in appearance except for an excess of blood. The pleural cavities were empty. The lungs contained numerous firm, white nodules, some of them as large as cherries. On section these presented a smooth surface and appeared of equal consistency throughout. The lung tissue was non-crepitant or very slightly crepitant, fairly firm and oozed dark blood. The pleura over the left lower lobe was roughened by an easily removable fibrinous exudate. The liver was engorged with blood and extended to the level of the umbilicus. The spleen was slightly enlarged and congested; the pancreas was negative; the kidneys, stomach, intestines, lymphatic apparatus and the central nervous system all appeared unchanged.

The lines of ossification in both long and flat bones were irregular, wider than normal, and hemorrhagic.

The heart.—On the anterior surface of the heart midway between the base and the apex, involving that part of the ventricular wall which faces toward the left, and also overlapping the ventricular septum, was a white area, quite circular in form and measuring approximately 1 cm. in diameter. The edge of this white area fused gradually with the adjacent heart tissue, and on section appeared less firm than the unchanged myocardium (Fig. 1.) It was seen to involve the entire thickness of the ventricular wall, spreading out more as it approached the pericardium, which was unchanged except as to color. The change in the muscle also extended into the columnæ carneæ of the left ventricle. On the posterior or diaphragmatic surface, near the right border of the heart, were situated three smaller but similar areas.

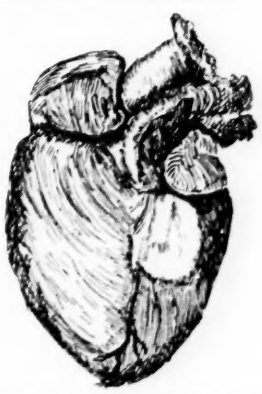

FIG. 1.—Gumma near the interventricular septum.

The heart cavities contained considerable blood partially coagulated. The valves and orifices showed no changes.

Anatomic diagnosis.—Congenital syphilis, syphilitic interstitial pneumonia (nodular); syphilitic osteochondritis; gummata of the heart; pustular syphilides of the skin; multiple abscesses of the thymus; hyperemia of the liver and spleen.

Microscopic examination.—The presence of syphilis was confirmed by the examination of the viscera, characteristic changes being found in the liver, lungs, spleen and lines of epiphyseal ossification. In sections made through the large lesion on the anterior surface of the heart, the following changes were found: Between the heart muscle fibers throughout the area, which to the naked eye appeared white, there existed a marked infiltration of round or partially fibrillated cells, with faintly staining vesicular nuclei. Although the change prevailed throughout it was most marked around the blood vessels (small arterioles). The change here began immediately outside the media, where distorted cells and cells of peculiar shapes, with faintly stained nuclei occurred. These were evidently formative cells, and resulted from proliferative

[1] The mixed infection which had resulted in this case was investigated by Mr. H. G. Wells and reported by him to the Chicago Pathological Society (Transactions Chicago Path. Soc., Vol. II, 1897).

changes in the adventitia (Fig. 2). Occasionally mitotic nuclear figures were here met with.

A marked proliferation of the subpericardial connective tissue had also taken place and the resulting new cells had invaded the heart muscle to a considerable depth. The phenomena observed resulting from leucocytic invasion were: 1. Leucocytes of the polymorphous variety in transit through the vessel wall (Fig. 2). This was distinct and frequent, resulting

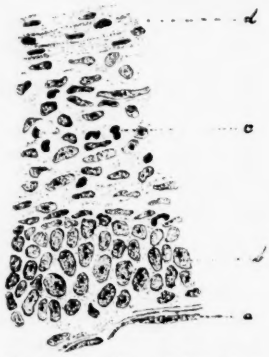

FIG. 2.—Showing the proliferation of the adventitia. *a*, intima of a small arteriole; *b*, nuclei of the muscle cells in the tunica media; *c*, leucocytes; *d*, muscle fibers.

in, 2, accumulations of leucocytes in the adventitia among the formative cells. 3. The occasional presence of single leucocytes at long distances from the vessels where all changes were slight and, 4, the accumulation of leucocytes in foci in which degeneration and necrosis of heart muscle fibers had taken place (Fig. 3). Not only had muscle fibers disappeared in such areas, but in some foci nuclear fragmentation of all the cells in the center of the focus had resulted and dust-like chromatin elements of the degenerated cells occupied that region. No bacteria were found in these foci of necrosis. Multinuclear cells were present in the perivascular cell increase, but the nuclei of such were closely set together and showed no peripheral arrangement or central necrosis as is so frequent in the giant-cells of acquired syphilis. No changes were found in or about the veins or in the endocardium.

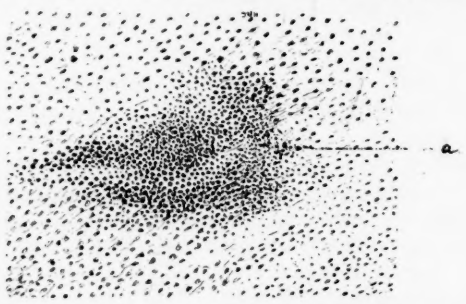

FIG. 3.—Area of necrosis and round cell infiltration. *a*, leucocytes.

The literature on congenital syphilis of the heart has been thoroughly summarized by Ludvig Hektoen in a case recently reported of "Multiple Foci of Interstitial Myocarditis in Hereditary Syphilis" (*Journal of Pathology and Bacteriology*, Edinburgh and London, January, 1896), and a search through the *Index Medicus* revealed no additional cases reported since his summary. The author above mentioned was able to find only nine previously recorded cases of hereditary syphilis of the heart, and these were collated in the well-known treatise by Mraçek.[2] In 112 cases of heart syphilis considered by Mraçek, nine had to do with hereditary syphilis and the syphilitic nature of some of these was doubtful.

Conclusions.—That this is an instance of syphilitic myocarditis is conclusively proven by the changes present in other viscera and the syphilitic osteochondritis. The title of "gummata" is simply a matter of preference; multiple foci of interstitial myocarditis with leucocytic invasion, areas of degeneration of the heart muscle and the occurrence of multinuclear cells resulted in areas which to the naked eye were of limited extent, whitish, and appeared softened, in other words, gummatous.

2 "Die Syphilis des Herzens bei erworbener und ererbter Lues." Arch. f. Dermat. u. Syph., Wien, Ergänzungsheft, II, 1893.

WHAT WE EAT AND WHAT IT COSTS.

BY D. H. GALLOWAY, M.D.
CHICAGO.

Few of us have any idea of the number of kinds of food which we eat in a year or of their absolute or relative cost. Man is said to be an omnivorous animal and this is generally taken to mean that he eats about equally of animal and vegetable food. The feeding of people collectively, as in the large public institutions, is not a test of the amount and variety of food consumed by the average man nor of the cost of it. Some time ago one of the Chicago papers instituted a prize competition for the best bill of fare which could be furnished for $500 a year for a family of five persons. This brought forward a great many statements of the cost of living. Some of these were doubtless accurate, while many others bore such evidence of inaccuracies as to make them worthless.

There is no question but that some persons habitually eat vastly more than others; one family may eat more expensive food than another without necessarily being better fed; in fact the value of food may be in inverse ratio to its cost. While in college I had a roommate who weighed 250 pounds, which was just about twice my weight. We occupied the same room, were about the same age, attended the some classes and in many ways our habits were similar. We took our meals at a co-operative boarding club of thirty students. Without our knowledge, some of our fellow-boarders kept a record of the approximate quantity of food which we ate in a week and they found that my heavy roommate ate more than three times as much as I did. Obese people are not always extraordinarily large eaters, but they usually are and they eat excessively of heat- and fat-producing foods. Some persons eat too little and keep their vital fires too low, but there are many more who eat too much.

Eating too much food, or food that is unsuitable, or at an unsuitable time or in an unsuitable manner, is the principal cause of the great number of distressing affections which go by the various names of dyspepsia, indigestion, etc., and every physician will testify to the great prevalence of these diseases in this country. Probably more suffering is caused by errors of eating than by the use of alcoholic beverages, enormous as the latter undoubtedly is. Not all they pay for is eaten by every family. The margin of waste in some is a very large factor, while in others practically nothing is wasted. In households where the culinary department is left to servants who are not constantly watched, a larger or a smaller percentage of the food cooked finds its way into the garbage can. Quantities of meat and vegetables, too small to make another meal, are thrown out and stale bread is disposed of in the same manner. In other families these things

are gathered up and go into hash or soup for the next meal, while the stale bread returns in wholesome bread pudding or as toast. Material which is wasted in one family often makes a wholesome, nutritious and appetizing meal for another.

It is not, however, so much the purpose of this article to show what we might live on as to indicate what we do live on and to present a table which has been carefully prepared from accounts which are accurate and from conditions which approximate those of the average comfortably situated American family. This table is made up from the books of Dr. Bayard Holmes' private hospital. The patients in this hospital were nearly all surgical cases and it is a well-known fact that patients who have undergone surgical operations eat as heartily as laborers during the period of convalescence. With one exception, these patients were all adults. I believe this table represents wholesome diet, adequate in quantity for the average family of equal size. It covers a period of 333 days, from May 1 of one year to March 29 of the next. The average number in this hospital family was 10.67 persons, so that we have listed here food sufficient for 3,582 persons one day or one person 3,582 days. It is equal to the board of 9.813 persons one year or one person 9.813 years. The first column of figures is the amount, where the amount can be given, of the item bought during the 333 days. The second column is the cost of the first. The third column is the amount consumed by one person in one year and the fourth column is the cost of the third. Of course, 158 loaves is not all the bread which was eaten by these ten people in 333 days, but only that which was bought as bread; most of the flour was made into bread in the house. This table is absolutely accurate in the main, though there may be small errors in a few things.

In order to obtain this record, I took the grocer's and butcher's books at the close of each month, checked up each entry and put all items of a kind together on a card. These cards were then ranged alphabetically and copied into a book. An item might appear in the grocer's book twenty times during the month, but it would appear but once in the account, the amount and cost including in one entry the total for the month. Since the numbers in the first column represent the amount consumed by 9.813 persons in one year, the amount consumed by one person is found by dividing the former number by the latter. Practically, I took the reciprocal of 9.813, which is approximately .102, and multiplied the numbers in the first column by this factor to get the numbers in the third column and by the same process the numbers in the fourth column are obtained from those in the second. There are 128 items in the table.

Article.	Amount bought.		Cost.	Amount Consumed.	Cost.
Baking powder	lbs.,	9	$ 4.05	.9181	$ .41319
Barley	lbs.,	4	.21	.4080	.02142
Beef extract	lb.,	1	1.60	.1020	.16320
Bread, 158 loaves			10.05		1.02510
Breakfast food	lbs.,	206	14.51	21.0120	1.48000
Butter	lbs.,	324	82.81	33.048	8.44662
Butterine	lbs.,	10	1.10	1.020	.11220
Cake			1.95		.19890
Canned cherries, 5 cans	lbs.,	12.5	.73	1.275	.07446
Canned corn, 57 cans	lbs.,	114	7.40	11.628	.75480
Canned peaches, 6 cans	lbs.,	15	1.00	1.530	.10200
Canned peas, 42 cans	lbs,	84	7.17	8.568	.73134
Canned plums, 1 can	lbs.,	2.5	.28	.255	.02856
Canned salmon, 53 cans	lbs.,	53	10.60	5.406	1.08120
Canned shrimp, 1 can	lb.,	1	.25	.051	.02550
Canned succotash, 12 cans	lbs.,	24	1.00	2.448	.10200
Canned tomatoes, 74 cans	lbs.,	222	9.35	22.644	.95289
Capers, 1 bottle			.18	.102	.01836
Catsup					
Cheese	pts.,	17	4.25	1.734	.48350
Chocolate	lbs.,	7	1.80	.714	.13260
		.5	.20	.051	.02040
Chow-chow		2	.70		.07140
Cider	qts.,	6	.72	.612	.07344
Citron			.22		.02244
Cocoa		6.5	2.88	.663	.29676
Cocoanut, shredded			.68		.06936
Coffee	lbs.,	57	21.66	5.814	2.20932
Cornstarch	lbs.,	5	.50	.501	.05100
Crackers	lbs.,	180	24.97	18.360	2.54694
Cream tartar	ozs.,	2	.10	.204	.01020
Eggs		4,536	69.21	462.672	7.05942
Flour	lbs.,	986	24.10	100.572	2.48520
Fruit, apples	pks.,	48	14.28	4.896	1.45656
Fruit, bananas		192	2.14	13.464	.21828
Fruit, blackberries		3	.44	.306	.04488
Fruit, cherries	boxes,	9	.83	.918	.08466
Fruit, cranberries	qts.,	6	.80	.612	.08160
Fruit, gooseberries	boxes,	2	.20	.204	.02040
Fruit, grapes	bskts,	25	7.03	2.550	.71706
Fruit, lemons		621	14.24	63.342	1.45248
Fruit, melons—canteloupes			8.24		.33048
Fruit, watermelons		18	5.40	1.836	.55080
Fruit, olives	pts.,	6	1.59	.612	.16218
Fruit, oranges		738	19.63	75.276	2.00226
Fruit, peaches	bskts,	22	7.30	2.244	.74460
Fruit, pears		12	.25	1.224	.02550
Fruit, pineapples		17	2.59	1.734	.26418
Fruit, raspberries	boxes,	9	1.65	.918	.16830
Fruit, strawberries	boxes,	84	10.59	8.568	1.08018
Fruit, whortleberries	boxes,	2	.30	.204	.03060
Fruit, dried apricots	lbs.,	16	2.80	1.632	.28560
Fruit, dried currants	lbs.,	3	.39	.306	.03978
Fruit, dried figs	lbs.,	16	3.10	1.632	.31620
Fruit, dried prunes	lbs.,	21	3.43	2.142	.34986
Fruit, dried raisins	lbs.,	12	1.55	1.224	.15810
Gelatin	ozs.,	70	7.00	7.140	.71400
Ginger ale	bottle,	1	.20	.102	.02040
Hominy	lbs.,	5	.20	.510	.02040
Honey	lbs.,	3	.60	.306	.06120
Ice	lbs.,	6,200	31.00	632.400	3.16200
Jelly	lbs.,	13	6.40	1.326	.65280
Lard	lbs.,	74	8.85	7.548	.90270
Macaroni	lbs.,	3	.45	.306	.04590
Matzoon	qts.,	107	24.35	10.911	2.48370
Meats			263.12		26.83824
Milk	qts.,	3,558.5	208.25	362.967	21.23946
Nuts	lbs.,	16	2.40	1.632	.24480
Okra			.18		.01836
Oysters	qts.,	25	6.41		.65382
Pumpkin pie		1	.15		.01530
Rennet		1	.25	.102	.02560
Rice	lbs.,	37	3.70	3.774	.37740
Spice, all-			.15		.01530
Spice, bay leaves			.05		.00510
Spice, cassia			.05		.00510
Spice, celery seed			.05		.00510
Spice, celery salt			.15		.01530
Spice, cinnamon			.13		.01326
Spice, cloves			.33		.03366
Spice, ess. lemon			.35		.03570
Spice, ess. vanilla		9	2.00		.20400
Spice, ess. ginger		2	.25		.02550
Spice, horseradish			.30		.03060
Spice, mint			.25		.02550
Spice, mustard			.45		.04590
Spice, nutmeg	oz.,	1	.10		.01020
Spice, pepper			.70		.07140
Spice, pickles			.05		.00510
Spice, sage			.05		.00510
Rock salt	lbs.,	110	1.10	11.220	.11220
Table salt	lbs.,	100	1.00	10.200	.10200
Spighetta	lbs.,	3	.45	.306	.04900
Corn starch	lbs.,	5	.50	.510	.05100
Sugar	lbs.,	671	34.19	68.442	3.48730
Syrup	qts.,	4	.60	.408	.06120
Maple syrup	oz.,	64	.70	6.528	.07148
Tapioca	lbs.,	1	.06	.102	.00610
Tea	lbs.,	15.75	13.52	1.606	1.37900
Vegetables, green, soup bchs			.52		.05302
Vegetables, asparagus			1.73		.17644
Vegetables, beans			3.16		.32234
Vegetables, beets			1.22		.12446
Vegetables, cabbage			.72		.07342
Vegetables, cauliflower			.25		.02554
Vegetables, celery			1.20		.12244
Vegetables, corn	ears,	222	3.04	22.644	.31008
Vegetables, watercress			.60		.06210
Vegetables, cucumbers			.88		.08976
Vegetables, eggplant		8	1.18	.816	.12036
Vegetables, lettuce			2.78		.28356
Vegetables, onions	qts.,	12	1.12	1.224	.11424
Vegetables, oysterplant			.25		.02550
Vegetables, parsley			1.55		.15810
Vegetables, parsnip			.02		.00204
Vegetables, peas			5.00		.51000
Vegetables, potatoes	pks.,	120	20.56	12.24	2.09712
Vegetables, Saratoga chips			.15		.01530
Vegetables, sweet potatoes			4.48		.45696
Vegetables, pumpkins			.10		.01020
Vegetables, rhubarb			.04		.00408
Vegetables, radishes			.80		.08160
Vegetables, spinach			.35		.03570
Vegetables, squash		2	.17		.01734
Vegetables, tomatoes	bskts.,	44	6.34		.64668
Vegetables, turnips			.10		.01020
Vermicelli			.25		.02550
Vinegar	qts.,	36	1.13	4.080	.11526
Yeast cakes		237	4.74	24.174	.48384
					111.72262

The following table is a synopsis of the foregoing one. I have grouped the items by classes and arranged them in the order of expense. The amount

in the column of figures is the cost of the article named for one person for one year.

Meats (including fish, oysters and lard)	$29.28082
Milk (cream and matzoon)	23.72816
Fruit (fresh, canned and dry)	10.79096
Vegetables (green and canned)	8.50791
Butter	8.44662
Breadstuffs (bread, flour, crackers and cereals)	7.55866
Eggs	7.05942
Coffee, tea and chocolate	3.60876
Sugar	3.48738
Ice	3.16200

Add together the foods of animal origin, meat, milk butter and eggs and a few more small items and we have $69.85516 as the cost of animal food which each one of us eats in a year, against $41.86736 for foods of vegetable origin which we eat in the same time.

It will be seen by reference to the table that in a year the average man eats 33 pounds of butter and pays $8.44 for it, 63 lemons at a cost of $1.45, 75 oranges at $2, uses 632 pounds of ice at $3.16, consumes 363 quarts of milk at a cost of $21.23, 462 eggs at a cost of $7 and 10 pounds of salt at 10 cents. It shows also that we spend as much for oranges as we do for potatoes, and more for fruit than for vegetables.

We paid for rent for each person $72.93. I looked over my private accounts and found that I paid for clothing in ten years (from the time I was 20 till I was 30 years of age) $525.73, an average of $52.57 for each year. Taking these figures as a reasonable average I find that it costs for the three principal necessaries of life as follows: Food, $111.72; shelter, $72.93, clothing, $52.57.

During this time (333 days with an average of 10.67 persons) we used 37,500 matches, 399 bars of laundry soap, 79 bars of cleaning soap and 206 bars of toilet soap. This indicates that each person uses 3,750 matches a year, or more than ten every day, and this is below the real number consumed, as we had one or two thousand on hand when this account began. It will be seen also that each person uses 20 cakes of toilet soap in a year or nearly two each month. This includes bath soap, and in this hospital every patient got at least one bath every day. During the entire time this hospital was under my management there was not sent out of it one pound of garbage nor any combustible refuse whatsoever; nothing but ashes and broken glassware and crockery was put out for the scavenger. Everything combustible was made into bundles with old newspapers and burned in the furnaces both in winter and in summer.

During this period we used 92,000 cubic feet of illuminating gas, for which we paid $99.54, equivalent to 9,384 cubic feet, at a cost of $10.15 per person per year. I have since looked up the amount of gas consumed for lighting purposes by a family of four people and found it to be 38,400 cubic feet, which makes 9,600 cubic feet for each person, and this corresponds very closely with the previous statement.

200 Oakwood Boulevard.

THOUGHTS ON THE APPENDIX.

Read at the meeting of the Middle Tennessee Medical Society, Nov. 18, 1897.

BY S. T. HARDISON, M.D.

LEWISBURG, TENN.

For the last decade the mind of the medical world has been turned to the region of the appendix, and possibly no part of the body has been so often before the profession for attention, both medical and surgical. The professional gentleman who has not had numerous cases of appendicitis to treat has either been careless in his diagnosis and investigations, or has had a clientele that is far behind in medical fads and fancies. The increased frequency of troubles that involve the appendix either primarily or secondarily, has caused much thought and many theories in regard to its treatment both medical and surgical, conservative and radical.

Many learned men of wide experience have espoused the conservative course, but possibly a greater number favor prompt surgical interference. Quite a degree of success has been attained, and many are almost entitled to be called experts in its management, and if failure to bring relief is the result, it is almost always attributable to the lateness of the operation. Indeed, some have advocated the removal of the appendix as a superfluous organ, a menace to health and comfort. Doubtless, this is a wise conclusion if it has no function to perform. When I mention the use of function of the appendix, I am aware of the fact that I am approaching a subject that not only has not been investigated, but one so unimportant and prospectively so barren and uninviting as to forbid investigation. Years have come and gone, medical students with scapel in hand have carefully studied the anatomy of the appendix and have often asked the question, What purpose do you serve in the mysterious make-up and mechanism of this creature so fearfully and wonderfully made? Up to the present moment no satisfactory answer has been returned. Some have suggested that it is a rudimentary appendage, and that possibly man in his early existence had different viscera from what he now has, and as his condition changed, his anatomic make-up changed to keep in harmony with his environments. Another theory is that the troublesome appendix is an accidental formation which never had any mission. I think that both these theories are unsatisfactory and humiliating, and without intent are a reflection on the wisdom, power and goodness of Him who not only doeth all things well, but who doeth all things perfectly. No imperfections can be attributed to Him. No accident can happen to mar His work. And man the last, most wonderful and most exalted of all His creatures could not come from His hands with defects and imperfections that are unknown to the make-up of his inferior creatures. Therefore, I must be permitted to emphasize the statement that the appendix is not a useless appendage, occupying its place without use or function; and while I may not be able to explain to you its function clearly and satisfactorily and demonstrate it beyond doubt or cavil, I do hope to encourage you to examine the matter, and not cast it aside as did the builders of the temple, that stone that was to become the head of the corner, because we already know that the appendage often becomes an important tail on the corner.

Let us look for a moment at the anatomy of the parts. First, we have the valve at the termination of the ileum that prevents almost completely the regurgitation of the contents of the bowels. We have the cecum as a kind of the receptacle or depot, and the ascending colon is indeed an elevator whose power to remove the accumulations in the cecum, opposed by gravitation when in the upright position, smaller diameter, dependent alone upon peristaltic action, and the least failure on its part to do the work produces stoppage and accumulation in the cecum. Now we want more power. The colon, the elevator is ready

but no power to put it in motion. The accumulation increases so gradually that the cecum distends slowly until the imperfect valve of the appendix is open, and the contents of the cecum press in. Irritation and stimulation is the result producing contraction and expulsion. This irritation and stimulation is communicated to the cecum, and by its contraction the contents are forced up through the colon or elevator, and the depot is emptied and the appendix closes (if no grape seed or any other hard substance becomes entangled in its valve) and remains quiet and in a restful state, until there shall be a similar demand made on it, to assist in removing undue accumulations in the cecum in a similar way. This would not be necessary if man did not maintain the upright position, hence no animals have an appendix except those that maintain the upright position, viz., the wombat, orang-outang and man. This is a strong circumstance in favor of the position taken. The appendix like any other organ has a limit to its capacity. If overworked and badly treated, it will break down and fail, and instead of performing its functions it will allow the contents to remain in it, producing inflammation resulting in gangrene, not only being destroyed itself but inviting destruction upon the whole body, upon the principle that a little leaven leaveneth the whole lump. This sacred adage has never been more forcibly illustrated than in the diffusibleness of a poison germ originating in or developing in the abdominal viscera.

Another potent factor that neutralizes the function of the appendix, is slow bowels or constipation exercising its influence by the damming-back process closing up the elevator or colon, increasing the demand on the appendix beyond its capacity until appendicitis is the result, and once developed it is almost sure to return. And as slow bowels have so alarmingly increased until constipation to a degree is almost the rule or natural condition of a majority of the people this is an easy explanation as to why appendicitis has grown from a very rare affection to one of remarkable frequency. Therefore, it is not true, that it has always existed to the extent that it does now and was overlooked by our illustrious predecessors, for in all other things they proved themselves the equals of the present day of great and glorious workers in medical and scientific research. Man's habits have changed. In fact the man himself has changed. He once had a large foot and a small head. He used a number ten shoe and a number six hat. He now wants a number seven shoe and a number eight hat. There is less physical exercise and labor for him. There is more mental worry and work for him. He does not go to bed and sleep all night as did his fathers. He does not live on coarse laxative food that required much mastication, developed his teeth and strengthened all his digestive powers. Hence indigestion, constipation and appendicitis were unknown to our ancestors, and would be unknown to us if we had proper food rightly prepared, taken at proper intervals, in necessary quantities, without hurtful stimulants and narcotics and all other things that have a tendency to retard digestion. Then let us not remove the appendix, but let it remain to perform its God-given function.

Let us relieve it and protect it. Take time to eat and time to sleep and to do everything that is necessary to preserve and protect the body, and so for as this life is concerned all will be well.

PHYSICAL DEVELOPMENT OF WOMEN.

Presented to the Section on Physiology and Dietetics at the Forty-eighth Annual Meeting of the American Medical Association, held at Philadelphia, Pa., June 1-4, 1897.

BY HARRIET E. GARRISON, M.D.

DIXON, ILL.

"Our civilization is hard upon the women," remarked a highly cultivated woman as she sat in my office discussing the way by which she could be restored to her usual vigor. This remark was called forth by my insistence upon the statement that nothing but absolute rest would enable the overwrought mind and body to recover their usual tone. The family inheritance of acumen and mental vigor, which had carried a brother to a seat upon the bench of the Supreme Court of our State, had sent the sister into all kinds of philanthropic works. These, and looking well to the ways of her household, had made serious inroads upon a once vigorous constitution.

Our civilization is hard upon women only because they are in a state of transition from the wholly material to the entirely intellectual. When all that was required of woman's brain was to read a little and write sufficient to keep up a limited correspondence, she had strength and energy sufficient to develop into a healthy, hearty housewife and mother. But now our school system demands that every girl, whatever her after-life is to be, must have brains developed sufficiently to write a book, without regard to the effect this may have upon her physical development. And every woman must engage in some kind of benevolent work no matter if she is starving for outdoor exercise, fresh air and sunshine.

Is there much inherent difference between the physical capacity of the sexes? A study of the agricultural laboring classes leads me to think that woman can be trained to as much physical endurance as man. Among the foreign peasants the women work side by side in the fields with their husbands and brothers, usually doing the more laborious part of the work. It is the woman of Germany, who, hitched side by side with her faithful cow draws the plow, while the man takes the less muscular but more intellectual task of guiding it. While on a visit to "the great red pipe-stone quarry" of Minnesota, as a tribe of indians were taking out their supply of pipe-stone, I noticed that the men cut the stone from the quarry but the women were out along the railroad track splitting discarded ties into fire-wood, and as we drove back to the town we marveled to see the immense load of wood fastened upon the back of each squaw as she returned to the camp. Among our own agriculturists I have been surprised at the amount of endurance displayed by the women. In one case a woman, the mother of four young children, after pitching hay upon the wagon all day endured the pangs of labor all night and called me in the morning; but the fetus had not yet reached maturity and I advised rest in bed after a quieting potion. But as soon as the pains were relieved she got out of bed and did the family washing and then went back into the hay field until the fetus matured, when she was delivered without the aid of an obstetrician Again I was summoned in haste to find her kneeling beside her bed with the livid face and gasping breath of the extreme anguish of angina pectoris. Hot applications, morphia and heart stimulants soon brought relief and then I found that she was within four weeks of her ninth accouchment. Besides her usual house and field-work she had been milking six-

teen cows night and morning. In two days after I saw her she went back to her usual work and in two weeks after her delivery she returned to her place in the dairy. Nor is this an isolated case; there are hundreds of women who enjoy such work.

But these cases are in marked contrast to those we meet among our intellectual women who are semi- or whole invalids from early childhood to the grave. Some of these are born invalids, inheriting neurosis from neurotic ancestors; others have invalidism thrust upon them. While we do not care to have our women become farm laborers, we would like to have them with sufficient physical endurance to do the work, both physical and intellectual, which falls to their share without that constant tired feeling of which so many of them are continually complaining.

I think the late Dr. Frank Hamilton gave us the key to the lack of physical development in our women when he wrote: "Calisthenics may be very genteel and romping very ungenteel, but one is the shadow, the other the substance of healthful exercise. Girls need health as much, nay, more than boys. They can only obtain it as boys do by running, tumbling, by all sorts of innocent vagrancy. At least once a day girls should have their halters taken off, the bars let down and be turned loose like young colts."

If our girls were turned loose to amuse themselves spontaneously, to run up hill and roll down, to skip and jump without rhyme or reason, except as it is supplied by the exuberance of their own innocent natures, there would be less headache in adult life. Only the other day an earnest, conscientious mother asked me about her little girl of seven, whether I thought it just right for her to allow her to romp on the floor with her little baby sister. As the mother expressed the matter, the girl had grown so rapidly she looked very ungainly rolling over the floor. "So much the more need for her to roll on the floor or grass that she may grow in strength and beauty," was the advice I gave the mother. In the tall, rapidly growing girl there is not sufficient nutriment supplied to the muscles to support the trunk in the erect attitude of standing, and rolling gives exercise to various sets of muscles without overtaxing them in trying to support the trunk. Many of our girls with round shoulders and rickety spines would have been saved these deformities had they done more rolling. A few weeks ago I had under my charge a girl of 12 years who was round-shouldered and small looking. She was very sick with la grippe and developed dangerous heart symptoms, for which I confined her in the recumbent posture for two weeks. When I finally allowed her to leave her bed, her mother was astonished at her great increase in height and declared she had grown four inches while in bed. I did not suppose there had been any actual gain as she had not taken sufficient nourishment, in fact she had lost in weight and the increase in height was due to the muscles having become rested and strong enough to hold the body in perfect shape. I advised the mother to have the girl spend half the time in bed until the muscles became more fully developed.

Fresh air, fresh water and sunshine should be the inalienable right of every child in this land of the free and home of the brave, but our women are starving for these very things. Not only are the girls from the sweat-shops and factories, who are shut in for ten or twelve hours where no sunshine or fresh air can reach them, crying Hood's refrain,

> "It's O, to be a slave,
> Along with the barbarous Turk,
> Where woman has ne'er a soul to save,
> If this is Christian work,"

but the woman of social position must give at least ten hours daily to her duties, shut in as closely from fresh air and sunshine as her humble sister.

Our school authorities do not recognize the need of fresh air and exercise in the sunshine, with plenty of fresh water, but year after year try to drill into starved brains knowledge, a greater part of which is of no practical benefit to that particular individual. If the State wishes to educate the children let it make the education common. As the schools now stand the privilege is extended to but a small fraction of the children, and these are the ones who least need the State's help. Let our school curriculum be made broad enough to include development of body as well as mind; let the schoolhouses be set away from other buildings with large, surrounding playgrounds. It is not necessary for the schoolhouse to be placed at the door of the scholar's home, but let there be public conveyances to carry the scholars to the door of the schoolhouse.

Nothing which the municipality could do would elevate Mott Street in New York more than for the children to be gathered up every day and carried a few miles into the country by an electric line to a pleasant school building with a ten-acre playground arranged as a park, with hills to climb and valleys to explore, and grounds for all games; with bath-houses and swimming pools, where once a week every child is made to plunge and taught to swim. This can be done with no more expense than our present school system. It may be necessary to shorten the time in which the scholar is the ward of the State, and our sweet girl graduates with their beautiful ribbons, laces and fluffs, with their tired, drawn faces which even "opalin" will not make young and fresh, may disappear, but in their places will come the fresh glad girls, able with their strong, healthy, young bodies to fill every sphere.

With this change must come other changes. Our civic authorities must take cognizance of the physical needs of our girls and provide places, with every facility for reaching them, where girls are incited to healthy exercise with basket-ball and other hardy games. The State levies a tax for free libraries where the girls may be shut in with foul air and with literature as detrimental to their minds as the air is to their bodies. If any one doubts this statement let them look over the list of books most called for in our public libraries. We do not want to banish all public libraries, though there is a class of books which should be banished, but with these supply play places with games and bathing facilities, where every girl can engage in the healthy exercise of swimming. The plea is sometimes urged that bacterial disease is transmitted in free bathing establishments, and so is every book used in a free library covered with germs; and more dangerous germs as they are gathered from the homes of diphtheria and typhus fever. If the water is frequently changed in the bathing pools the danger of contagion is reduced to an infinitesmal quantity. In communities where there are clear running streams there are hundreds of women who never have a plunge-bath from the cradle to the grave; from birth to burial they never know the cleansing which only submersion in clear, pure water can give. Here the fastidiousness

of the community prevents the bountiful provisions of nature for woman's physical needs from being utilized; and even boys are fined for yielding to temptation of the pure sweet influence of the running water anywhere within telescopic view of the over-nice passer-by. Verily, those who do not bathe should pay the fines, as the crimes of the community are perpetrated by the great unwashed. To be unwashed for a week should be a crime. Every community too large or cultivated to use primitive bathing methods should provide free bathing facilities within its borders, and the women of the community should be urged to make use of these unless they have private arrangements for plunge-baths. Nature has clearly indicated that to be thoroughly cleansed the body must be submerged in water, even the ears which so many fill with cotton before a plunge will be none the worse for being washed out with pure water.

Let every physician assist in enforcing the law for shorter working hours for women, and urge that their free hours be spent in healthful outdoor exercise, and we will have a brighter, healthier, happier set of women.

A CASE OF VICARIOUS MENSTRUATION FROM THE LUNGS.

BY T. L. CHADBOURNE, B.S., M.D.
COLUMBUS, OHIO.

Cases of vicarious menstruation are not rare, but cases of long-standing vicarious bleeding from the lungs are tolerably uncommon.

On consulting the literature one is struck by the small number of such cases that have been reported in this country.

The *Index Medicus* from 1888 to June, 1896, has only about twenty-five distinct references, the *American Journal of Obstetrics* from 1886 less than ten, and the *American Journal of the Medical Sciences* for the same time has but one case indexed.

The chief interest of these cases lies in their connection with the question of tuberculosis. Some of them are mistaken for phthisis, while many of them really are tuberculosis, and only later develop the signs of the disease.

Thomas[1] reports a case of a patient, age 40 years, who, after twenty years of normal menstrual life, slowly began to have hemorrhages from the lungs. She lost weight greatly and had every appearance of pulmonary phthisis. Physical examination showed no signs in the lungs, but disclosed an occluded cervical canal. After operation the patient recovered entirely in six weeks.

Ford[2] reports a case of a patient aged 25 years, who menstruated at 15, at 19 took cold and ever since has had pulmonary hemorrhage for three or four days every month; has not lost weight.

Stuart[3] calls attention to a patient with the following history: Age 15 years; menstruated at 14; tuberculous family history.

The patient suddenly began to have vomiting of blood with occasional hemoptysis. After seven months she developed signs of tuberculosis and a few months later died of this disease.

Stuart calls attention to the fact that, from the first, the case was thought to be tuberculous, although for seven months no signs could be made out.

[1] Amer. Jour. Obst., XIX.
[2] Amer. Jour. Obst., XXII.
[3] Journal American Medical Association, IX.

Kober[4] gives a very interesting case as follows: Age 18 years and 9 months; has never been ill; menstruated for two years.

February 10 she had a slight period and marked hemoptysis; was very sick at stomach. At this time she developed a mild pneumonia behind, below, which resolved in ten days.

March 4, again hemorrhage, nausea and pneumonia. Soon after this, catarrh of the right apex. A third time she had hemorrhage, with other symptoms as before. She died in June, of tuberculosis.

The hemoptysis came on at a time when no suspicion of pulmonary disease could exist, and the author insists that the prognosis in cases of recurring hemoptysis must be very guarded.

May 8, 1896, there came to the Michigan University Hospital a patient for examination of her lungs, as she was thought to have consumption.

The patient gave the following history: Age 18 years, menstruated at 14; one sister dead of spinal disease; no history of lung trouble. The patient has generally been well; three years ago had typhoid; says she has had slight hacking since. For the last year, slight yellowish expectoration, never bloody except as stated below.

Since her eighth year she has had enlarged glands in the neck. These have varied in size, have never suppurated. Have once or twice been favorably influenced by iodin.

Fifteen months ago she took cold, and the next afternoon, during a severe coughing fit, suddenly began to spit blood, which came up rapidly; for the most part rather thick, although some of it was frothy; quantity sufficient to saturate two or three handkerchiefs. Her period was due at this time. Regular flow did not occur, but she continued to spit blood for four days. She missed her next three menstrual periods, but at the times these were due she spat blood, although never so much as at first.

The regular flow then reappeared and was normal for four months, during which time there was no hemoptysis. During the five next succeeding months the hemoptysis again replaced the catamenia. During the last three months the flow has occurred in the normal manner.

The bleeding has usually occurred just at the time of the catamenia, although in one instance last winter it was delayed about a week.

With the hemorrhage she has pain in the chest and a good deal of nausea, both before and afterward. There is no disturbance of the stomach at other times.

She has slight bearing down pains during the first part of her period. The flow is scanty and she is slightly irregular, usually postponing.

Physical examination at this time showed, aside from the enlarged glands in the neck, no anomaly, the lungs being entirely negative.

May 27, she entered the hospital and, during a stay of a week, was several times examined and the following notes were made: Patient undersized; muscles in fair condition; tongue large, with thin white coating; on both sides of neck enlarged glands, varying in size from a walnut to a pea; glands in left axilla also slightly enlarged; they are elastic, not tender, not adherent; skin not reddened. Thorax long, narrow, especially below; of moderate depth; epigastric angle narrow. Lying, supraclavicular spaces are symmetric. Expansion slight but symmetric. Palpation is negative.

Percussion: Good resonance over apices and clavicles, slightly fuller left than right. Further percussion yields good resonance everywhere.

Auscultation: Normal vesicular over both apices; slightly interrupted vesicular under clavicles on both sides; normal vesicular elsewhere; no adventitious sounds.

Heart negative.

Genital tract examined by Professor Martin, who found, aside from a rather small uterus, no abnormity.

Further physical examination negative.

Urine: Small amount, negative.

Blood: Covers show some variation in the size of the erythrocytes; leucocytes 4,200; reds, 4,446,000; hemoglobin (Gowers) 70 per cent.

Although she remained in the hospital a week, no sputum could be obtained.

[4] Berl. Klin. Wochenschr., 1895.

She was lost sight of till Feb. 2, 1897. She now reports herself as being in good health, weighing fifteen pounds more than last May. During the past summer she twice noticed small amounts of blood in the sputum, not at times of period; probably accidental. Physical examination at this date is again, aside from the enlarged glands, which have changed but little, entirely negative. Menstruation has been regular.

The following points seem worth noting:

1. The patient has had periodic hemorrhage from the lungs for a long time, at least nine times within a period of fifteen months, without having, up to the present date, any demonstrable signs of lung disease.

2. In view of the fact that so many such cases are later seen to be tuberculous, prognosis was guarded, the more so on account of the enlarged glands.[5] The fact that the patient has to all appearance recovered does not make it impossible that she may still have a healed tuberculous lesion in her lungs.

239 E. Town Street.

PRIMARY SARCOMA OF THE IRIS.

A STATISTICAL STUDY, WITH THE REPORT OF AN ADDITIONAL CASE IN WHICH THE GROWTH WAS SUCCESSFULLY REMOVED BY IRIDECTOMY.

Presented in the Section on Ophthalmology, at the Forty-eighth Annual Meeting of the American Medical Association, held at Philadelphia, Pa., June 1-4, 1897.

BY CLARENCE A. VEASEY, A.M., M.D.
PHILADELPHIA, PA.

Primary sarcoma of the iris is an affection so seldom met with that a report of each isolated case requires no apology. The following notes are from a very interesting case, kindly referred to me by Dr. Joseph J. Burke, from whom the growth was successfully removed by a broad peripheral iridectomy.

M. B., aged 46 years, a male, had been suffering from an inflamed left eye for three weeks when I was first asked to see him at his home. There was excruciating pain in the bulb that extended backward through the temporal region to the left side of the head, accompanied by intense photophobia on the least exposure to light, which was attributed by the patient to an attack of neuralgia. An examination, however, revealed marked pericorneal injection, a discolored iris, a contracted pupil with numerous posterior synechiæ and what appeared to be a brownish growth in the upper inner quadrant of the iris. Hot compresses at frequent intervals followed by the instillation of a solution of sulphate of atropin was the treatment prescribed and the patient was told to report at my office on the following day for further examination. Upon this occasion his vision was found to be for O. D. 5–9 and for O. S. 5–27, the latter eye being under the influence of a mydriatic and the patient complaining of everything looking very foggy. The vision of the left eye was unimproved by glasses. An examination of the right eye showed it to be normal with the exception of a low refractive error, which, when corrected, gave him perfect visual acuity.

An examination of the left eye showed an evenly dilated pupil except up and in. In this portion there were no synechiæ, but a small brownish tumor of the iris, somewhat ovoidal in shape, could be seen, the lower end of which was pushing the posterior pigment layer of the iris downward and backward giving to the pupil the shape seen in Fig. 1. With the red reflex from the fundus as a background the position of the lower end of the growth could be distinctly observed in the pupillary space. The growth itself was not so long as the entire width of the iris, as some iris tissue seemed unaffected both on the ciliary and pupillary ends, as well as upon the sides. It had the appearance of a foreign body making a bed, as it were, in the stroma of the iris, yet entirely separated from it and pushing the pigment layer before it as it grew backward. No blood vessels could be detected passing over its surface nor could any hemorrhages be seen. The capsule of the lens was somewhat cloudy and there remained a ring of pigment spots where the iris had been attached. No family history of tumors of any kind or specific personal history could be elicited. The patient had had some necrosis of one of the bones of the leg many years before, which had been entirely cured. He has three healthy living children.

Upon examining a photograph of the patient taken eight years before, there was a suspicious looking shadow on that portion of the iris occupied by the growth that looked as if it might have been a dark spot. A history of two other attacks of "neuralgia," evidently iritis, during this period affords additional evidence that the growth had existed for some time, though unnoticed by any of the patient's friends or members of his family. For three weeks before my examination it had been increasing rapidly in size and there was present a severe plastic iritis.

FIGURE 1.

Upon consultation with Dr. George E. de Schweinitz he agreed with me that the growth was probably a primary sarcoma of the iris, but to give the patient the benefit of the doubt it was thought proper to administer mercurial inunctions and rapidly increasing doses of potassium iodid for a short time to see what effect might be obtained. These remedies were faithfully employed for one week. at expiration of which time the growth was nearly twice as large as when first seen and the iritis was fully as bad, the pain still being intense, while the lens as well as the capsule was undoubtedly becoming opaque through the backward pressure of the lower, or pupillary end.

The growth was excised with a broad peripheral iridectomy without complication, except a profuse hemorrhage as soon as the inflamed iris was cut, a bent keratome and ordinary iris forceps being employed, there being no difficulty in drawing it out with the portion of the iris in which it was embedded. A small tag of the iris caught between the lips of the wound giving some pain for a moment, but as soon as it was released the pain disappeared. The eye made

[5] We wished to remove one of these for purposes of diagnosis, but were not allowed.

an uneventful recovery notwithstanding iritis was present at the time of operation. The opacity of the lens continued to increase until vision was reduced to light perception, when, though much clear lens substance was present, it was extracted through a three millimeter corneal flap without complication. This was about eight months after the first operation. Though the vision in the left eye, before the growth was removed by the iridectomy, equaled only 5–27, after the extraction of the opaque lens with the correcting glass vision equaled 5–6 and Jaeger 1 was easily read. So far as can be seen there has been no recurrence of the disease, fourteen months having elapsed since the growth was removed.

The tumor was somewhat crescentic in shape, being markedly concave on its inner surface and convex on its outer surface, measuring 2.5 millimeters in length, 1.5 millimeters in breadth and 1.5 millimeters in thickness. It was hardened in Müller's fluid and several sections were submitted to my friend, Dr. H. F. Harris of the pathologic laboratory of the Jefferson Medical College, who kindly furnished me with the following description of the growth and superintended the drawings, which were made by Miss Elizabeth Hard-

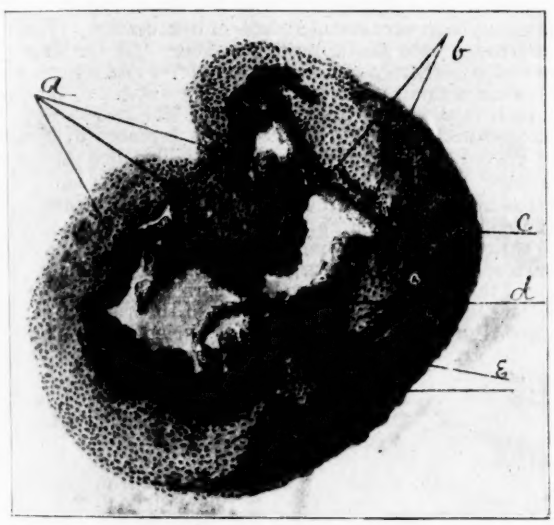

FIGURE 2.

ing: "Four sections of the tumor were submitted to me for microscopic examination. In general outline and size they are practically identical; in form they are somewhat kidney-shaped. In the center of each is a U-shaped open space (Fig. 2), the convex border of which corresponds with the convex border of the mass. Bounding this opening and forming the inner layer of the tumor is a continuous layer of dark pigment plainly discernible with the unaided eye. The sections of the tumor given to me are thus seen to consist of an irregular but continuous ring surrounding an irregular opening. The convex portion of this ring is more than double the thickness of the concave portion. The portion where the iris was attached is not seen in any of the preparations. This fact and the peculiar shape of the section can only be explained bp the supposition that the tumor had grown forward forming a hollow somewhat hemispheric mass, the concave surface of which was lined by the pigment layer of the iris, and that segments of this mass were cut anterior to its attachments. One of the sections was stained with hematoxylin and eosin, and the others with carmin. Under a low power the tumor was seen to consist of small round cells with a considerable amount of intercellular substance. Numerous blood vessels were seen scattered through the growth. These vessels were especially numerous in the tissue forming the thin concave portion of the ring, and were remarkable for the thickness of their walls and for the fact that they contained no blood. The vessels of the thicker portions were filled with blood, and so far as could be seen had no walls, the blood being apparently in direct contact with the cells of the tumor. Numerous dark brown pigment granules were seen scattered through the tissues of the thicker portions of the ring. This was especially marked around the outer border. The pigment layer surrounding the inner border of the tumor was dark brown, almost black in color, and while continuous, was very irregularly disposed over the surface, several bands projecting into the open space in the center of the mass.

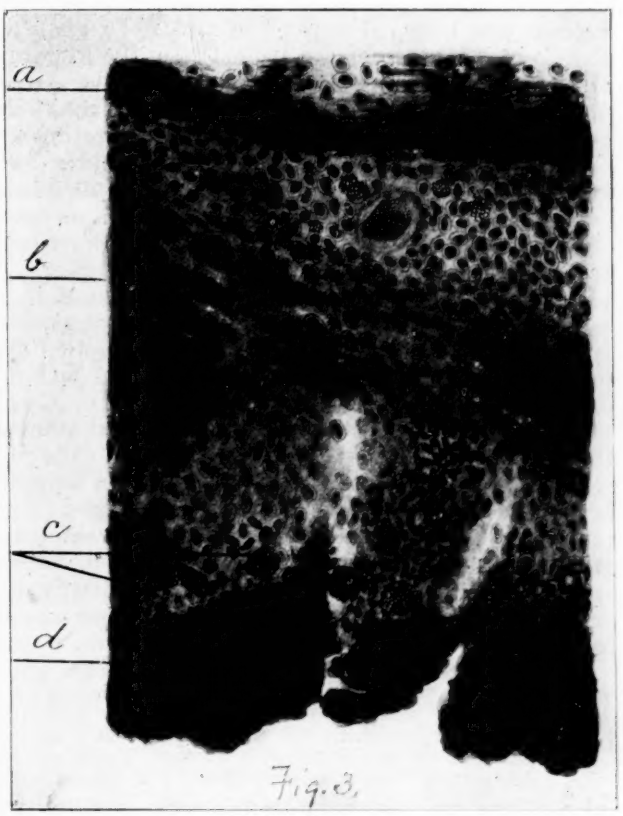

FIGURE 3.

"When examined with higher powers the cells which compose the greater part of the tumor were seen to be small round cells with which were intermingled a few oval ones (Fig. 3). These cells were almost of uniform size, having a diameter of from 10 to 12 microns. Their nuclei were stained of an almost solid color both in the hematoxylin and carmin preparations, in no case being sufficiently well preserved or stained to show the finer details. The nuclei were surrounded by a thin rim of protoplasm in which there were often embedded multiples of small pigment growths. In many situations, notably about the center of the thicker portions of the tumor, there is a considerable amount of firmly granular intercellular substance. In several places distinct bands of fibrous tissue and minute bundles of involuntary muscular fibers can be distinguished. Most prominent along its convex border,

but scattered throughout the tumor, are numerous masses of granular dark brown pigment, varying in size from immeasurably small particles to collections having a diameter considerably greater than that of the cells which compose the tumor. From the pigment layer which covers the inner surface of the tumor numerous fine spiculæ of pigment substance are seen projecting between the neighboring cells. The tumor is, however, much less pigmented here than along the outer border and as has been before mentioned, much of this pigment is found within the protoplasm of the cells. The inner pigment layer presents the characteristic appearance of the pigment layer of the iris. The tumor is I think beyond doubt a pigmented, small round-cell sarcoma."

During the past twenty years several analyses of the previously recorded cases of sarcoma of the iris have been published, the most extensive, however, being those of Fuchs, Andrews and Werther. In 1882 the former published his classic treatise, "Das Sarcom des Uveal Tractus," in which he analyzed sixteen cases that he had collected from the literature up to that time. In a recent number of the *Archiv für Augenheilkunde*, F. Werther adds to Fuchs's list twenty-three cases collected from the literature appearing between 1882 and 1893. These tables have to a considerable extent evidently been compiled from incomplete abstracts of the original reports, as many of the important details of some of the cases have been omitted in the former but are found in the latter. In addition some of the cases have been found to be incorrectly classed; for example, when a non-pigmented sarcoma is placed under the heading "melanotic," and some of the cases were never operated on and are therefore useless for statistical purposes.

In the following list a few cases recorded prior to 1893 that seemed to have been overlooked in the previous papers, as well as those that have been reported from that date to the time of writing this paper (February, 1897), have been added. No case in which the growth was not operated on, and hence no histologic examination made has been included. Briefly, the principal points in the history of each case are as follows:

Case 1.—Adams. A female, 13 years of age, was brought to the author with a small brown tumor about twice as large as a pin's head situated on the lower and outer part of the left iris. While treating with mercury the size increased and another mass appeared in the neighborhood of the first. Vision equaled $^{20}/_{50}$. Several opaque spots were observed in the deeper layers of the cornea. Enucleation was performed and the growth was found to be a round-celled sarcoma.

Case 2.—Alt. This case was a female 2 years of age. One month before the examination a small growth had been noticed on the right iris. The lens was cataractous. Tension at first was normal but later became elevated. There were several nodules throughout the iris, the largest being in the lower and outer quadrant. Enucleation was performed and the growth, which originated in the parenchymatous tissue of the iris, was a round-celled sarcoma.

Case 3.—Andrews. The patient, a female 47 years of age, had noticed discoloration of the left iris at the site of the growth for many years. The vision of this eye had been periodically obscured for fifteen months. There was no pain and the vision of each eye equaled $^{20}/_{100}$. Iridectomy was performed and was followed by suppuration of the globe requiring enucleation a week later. Microscopic examination showed that the entire growth had been removed by the iridectomy. There had been no recurrence eight years later.

Case 4.—Andrews. This patient was a female, aged 43 years. A small growth on the left iris had been observed for a long time. The tension was elevated but the vision equaled $^{20}/_{20}$. There was some circum corneal injection but no pain. Enucleation was performed and the growth proved to be a pigmented spindle celled sarcoma originating in the stroma of the iris. The canal of Schlemm was somewhat narrowed and surrounded by a collection of the spindle-shaped cells.

Case 5.—Buffum. A female, aged 55 years, had noticed a "peculiar appearance" of the right iris for eight years. She had become blind in this eye gradually after repeated attacks of inflammation. The last attack was present three weeks before the examination. Since then the pain had continued. There was an injected bulb and the tension was about + 2. In the upper part of the iris there was a cyst-like development involving the upper two-thirds. The lower third contained several brownish spots. The aqueous was muddy, the lens hazy and the fundus indistinguishable. The growth was removed by iridectomy. Recurrence took place in three months. Enucleation was then performed. No recurrence had taken place at the expiration of eighteen months. The tumor was a spindle-celled sarcoma. The ciliary body had become secondarily involved.

Case 6.—Carter. The patient was a male, age 15 years, who had noticed several small specks on the left iris for three months, and two small specks on the right iris for fourteen days. At the time of the examination there was a yellowish growth half as large as a pea in the lower and inner quadrant of the left iris and small yellowish spots at the margin of the right iris in the external half. There were small circular opaque deposits in the layers of the cornea. The tension was normal and Jaeger 1 could be read with each eye. Iridectomy was performed in the left eye but the growth recurred. In the right eye the spots were so enlarged nine months after the operation that only large objects could be seen. The tumor was a round-celled sarcoma.

Case 7.—Charnley. This patient was a male, aged 16 years. A spot had been observed on the iris eleven years before and there had been occasional attacks of obscuration of vision from hemorrhage into the anterior chamber. At the time of the examination there was found on the lower and inner quadrant of the iris a small brownish-gray tumor about one-twentieth of an inch in diameter. Vision equaled %. Recently red spots had appeared on its surface. It was removed by iridectomy and proved to be a non-pigmented spindle-celled sarcoma.

Case 8.—Collins. A male, aged 21 years, presented himself for the treatment of a brownish growth of the left iris that was situated on the inner and lower quadrant. A photograph of the patient taken four years before the examination showed a brown spot on the lower and outer portion of the iris. At the time of the operation, however, the larger portion of the growth was on the lower and inner quadrant of the iris. Vision equaled % and the tension was "full." Enucleation was performed and the growth, which was a pigmented, small round-celled sarcoma, had not recurred in seventeen months.

Case 9.—Dreschfeld. A female, aged 53 years, had noticed some trouble with the left iris for two and one-half years. Examination showed a reddish-grey tumor about the size of a split pea in the lower part of the iris. The eye was enucleated and the growth, which probably originated from the intermuscular tissue of the iris, was a non-pigmented spindle celled sarcoma. The patient was under observation for several years, there having been no recurrence when last seen.

Case 10.—Edsall. A female, aged 23 years, had observed a small growth on the temporal side of the left iris, midway between the peripheral and pupillary margins about two years before. At the time of the examination the growth was about the size of a split pea covering the pupillary space and of a dark gray color with a smooth surface. The tension was elevated and the vision equaled $^{20}/_{30}$ through a small hole in the center of the growth. Frequent hemorrhages were observed in the anterior chamber. Although the personal and family histories were negative, mercury and potassium iodid were administered for a time but without any beneficial result. Enucleation was then performed and the growth was a pigmented, small spindle-celled sarcoma.

Case 11.—Ewetzky. This patient, a male, aged 38 years, had noticed some trouble with his left eye for two weeks. Examination revealed a growth in the posterior part of the upper half of the iris pushing the iris forward and pressing on the lens. The tension was normal at this time but later became elevated. Vision equaled $^{10}/_{70}$. As there was a history of syphilis acquired fifteen years before, the patient was treated with mercury, but vision became reduced to the counting of fingers. Enucleation was then performed and the growth proved to be a pigmented round-celled sarcoma.

Case 12.—Fano. The patient was a male, aged 19 years, who had a small brownish growth partially filling the anterior chamber of the left eye. There was same injection of the eyeball and slight vascularization of the cornea with hypopyon. Light could not be distinguished. The cornea was perforated. The operation for staphyloma was first performed and a week

later the stump was enucleated. The examination showed small, regular, pigmented cells.

Case 13.—Hirschberg. The patient was a man aged 38 years, who had noticed a dark spot on the iris of the right eye since childhood, but which had been increasing in size for one year. The visual acuity equaled $^{20}/_{30}$ and the tension was normal. At the time of the operation there was a brownish growth occupying the lower two thirds of the anterior chamber that had originated in the lower portion of the iris. Enucleation was performed, and microscopically the growth was a pigmented spindle-celled sarcoma, probably originating from the anterior layers of the iris. There was no recurrence in six months.

Case 14.—Hosch. A male, aged 66 years, had observed a brown spot on his right iris since youth. There was some injection in the lower part of the conjunctiva but no pain. The lower part of the anterior chamber was filled with a light brown growth that was pushing the iris slightly backward, and that extended almost to the center of the pupil. Externally the margin of the tumor was well defined; internally it disappeared into the iris stroma so that no line of demarcation could be made out macroscopically. The tension was normal and the vision, which at first equaled $^{15}/_{30}$ with a Hm. of 2D., at the time of the operation equaled $^{15}/_{100}$. The bulb was enucleated and the growth, which was 4 millimeters thick and 7 millimeters high, was confined to the iris and microscopically proved to be a pigmented spindle-celled sarcoma.

Case 15.—Kipp. A male, aged 36 years, had noticed a spot on the right iris twelve years before. For one month it had been growing very rapidly. At the time of the operation there was a whitish growth that covered a large portion of the pupil. Tension was normal and vision equaled $^{20}/_{20}$. The growth began in the lower and inner quadrant of the iris. It was excised by iridectomy and proved to be a non-pigmented spindle-celled sarcoma that probably originated in the iris stroma. There was no recurrence in eighteen months.

Case 16.—Knapp. A male, aged 36 years, had a growth occupying about one third of the iris, which was whitish and obstructed the entire pupil when the latter was not dilated. Vision equaled $^{20}/_{70}$. Iridectomy was performed and there had been no recurrence of the growth at the expiration of a year. The latter was a non-pigmented spindle-celled sarcoma originating in the iris stroma without any definite line of demarcation.

Case 17.—Knapp. A female, aged 35 years, had a blackish growth about as large as a pea, situated in the lower part of the iris that had been present for many years. During the four years preceding the examination there had been attacks of iritis and temporary increase of intra ocular tension. At the time of the examination, however, the tension was normal and the visual acuity equaled $^{20}/_{100}$. There was some lenticular opacity that was supposed to have been congenital. An iridectomy was performed and the tumor, which proved to be a pigmented spindle-celled sarcoma, grew from the iris stroma without any definite line of demarcation. There were two mild attacks of iritis after the operation, but no recurrence of the growth had taken place in three years.

Case 18.—Knapp. A male, aged 22 years, had observed a small speck in his left iris ten years before. Examination showed a yellowish red growth extending from the iris into the anterior chamber, originating in the lower and outer quadrant and studded with red dots and lines. The tension was normal, although temporarily elevated at times, and the vision was $^{20}/_{20}$. The growth was removed by an iridectomy and proved to be a non-pigmented round-celled sarcoma originating from the iris stroma without any definite boundary line.

Case 19.—Knapp. A female, aged 53 years, had observed a tumor of the upper and outer quadrant of the iris four months before the examination that had been rapidly increasing in size. It was rather reddish and about the size of a cherry stone. The tension was normal and the vision equaled the perception of light. The eye was enucleated and the tumor, a round-celled sarcoma, was found to have originated from the root of the iris near the ciliary processes.

Case 20.—Krükow. A woman, 25 years old, had noticed for more than seven years a small black spot in the upper and outer quadrant of the right iris. The growth filled about one-fourth of the anterior chamber, covered half of the pupillary space and reached to the cornea. There had been some hemorrhages into the anterior chamber but these were always absorbed. Vision equaled $^{12}/_{30}$ (myopia $^{1}/_{36}$). The tension was normal. Iridectomy was performed for the removal of the growth which was a pigmented sarcoma consisting of spindle and round cells. There was no recurrence in one year.

Case 21.—Lebrun. A female, aged 36 years, had noticed failing vision for three months, during which time some brownish spots about the size of a radish seed were observed near the external periphery of the iris. The eye was blind. After treating for a while with negative results an iridectomy was performed. Inflammatory symptoms were so great, however, that two weeks later enucleation was performed. The growth was a pigmented mixed, round and spindle-celled sarcoma.

Case 22.—Limbourg. This patient was a female, seven and one half years of age, whose vision in the left eye had been much reduced for fourteen days. There was slight episcleral injection and some fine lymph exudate was observed on the posterior surface of the cornea. The anterior chamber appeared to be deeper than normal. The upper and inner part of the iris was occupied by a small yellowish growth, with a smooth surface that reached to the cornea in front. The tension was elevated and vision equaled the counting of fingers at 1 M. The eyeball was enucleated and the growth proved to be a non-pigmented round-celled sarcoma. The ciliary body and canal of Schlemm had become secondarily involved.

Case 23.—Little. The patient, a female, aged 20 years, gave the history of sudden blindness in the right eye sixteen months before while stooping. This lasted for about one week. On recovering her vision she noticed for the first time a spot on the colored part of the eye. During those sixteen months there had been three or four attacks of dimness of vision at irregular intervals, but after each attack vision had returned. These were presumed to be due to hemorrhage into the anterior chamber. At the time of examination there was a pale brown mass about the size of a small pea in the lower and outer quadrant of the iris that extended from the pupillary margin to the periphery. Vision equaled $^{20}/_{20}$. The growth was removed by an iridectomy and was found to be a pigmented round-celled sarcoma. There had been no recurrence in twenty-one months.

Case 24.—Oemisch. A female, aged 42 years, had observed six years before a dark spot on the lower and inner quadrant of the iris, from which there were occasionally hemorrhages. During these periods the vision was markedly reduced. After a period of quiescence it began to grow rapidly. In the anterior chamber there was a dark grayish-blue mass that reached nearly to the surface of the cornea and covered a large part of the lower and inner quadrant of the iris. It was about as large as a pea and reached to the pupillary margin. Iritis had been present. Vision equaled $^{5}/_{9}$. The growth was removed by iridectomy and was a non-pigmented spindle-celled sarcoma. There was no recurrence in four months and the patient had useful vision, being able to read "calendar figures" at 6 M.

Case 25.—Pflüger. The patient was a female, aged 55 years, who had observed a growth on the right iris six years before. It had been gradually increasing in size and there was entire absence of pain. There was a history of malignant disease in the mother originating in the naso-orbital region and extending to the globe of the eye. In the present case the cornea was normal. In the lower outer quadrant of the iris there was a dark brown tumor of irregular contour about 3 by 4 by 5 mm. in size, extending from the periphery of the iris almost to the pupillary margin. Above the horizontal meridian there was a second smaller growth, separated from the other near the pupil by healthy iris tissue, but connected with it near the periphery of the iris. The pupil was round, but with mydriasis there seemed to be posterior synechiæ and opacity of the lens and capsule. Vision equaled $^{5}/_{15}$ in each eye. A broad peripheral iridectomy was performed, removing both parts, and there had been no recurrence in two years. The visual acuity remained $^{5}/_{15}$. The growth was a pigmented spindle-celled sarcoma.

Case 26.—Pflüger. In the same paper the author records a case occurring in the practice of Dr. Horner, the history of which is as follows: A female, 36 years of age, had been aware for ten years of the existence of a small black spot on the lower quadrant of the left iris, that for a short period had been gradually increasing in size. The eyes were not inflamed. The pupil was oval and the growth extended from the margin of the pupil to the angle of the anterior chamber. It was removed by iridectomy and had not recurred at the expiration of three years. The microscopic examination is simply stated to have proved the diagnosis of sarcoma to have been correct.

Case 27.—Quaglino and Guiato. The patient was a female child, aged 6 years, on whose left iris there had been observed a small growth three months before. There was no irritation nor severe pain. Tension equaled + 2. The patient could only count fingers, and the mass occupied about two-thirds of the anterior chamber. The parents were perfectly healthy. Enucleation was performed and was followed by a phlegmonous inflammation of the orbit. Microscopic examination showed the growth to be a pigmented round and spindle-celled sarcoma.

Case 28.—Robertson and Knapp. A female, aged 24 years, complained of poor vision in the right eye for one year. Exam-

Number.	Author.	Sex and age.	Eye affected.	First noticed.	Condition at time of operation.	Tension.	Visual acuity.	Primary position of growth in iris.	Operation.	Later history.	Histology.
1	Adams	F., 13	O. S.	. . . . .	Brown growth as large as two pins' heads with a smaller one adjoining.	. . . . .	20/50	Lower and outer quad.	Enucleation.	. . . . .	Round-celled.
2	Alt	F., 2	O. D.	One month before examination.	Several nodules throughout iris, the largest being in the lower outer quadrant.	At first normal in 2 weeks +	L. P.	Lower and outer quad.	Enucleation.	. . . . .	Round-celled.
3	Andrews	F., 47	O. S.	Discoloration at site of growth for many years.	. . . . .	. . . . .	20/100 20/100	. . . . .	Iridectomy, fol. by suppu. in globe necessitating enucleation a week later.	. . . . .	. . . . .
4	Andrews	F., 48	O. S.	Small growth observed for a long time.	. . . . .	+	20/20	. . . . .	Enucleation.	No recurrence in 8 years.	Pigmented spindle-celled.
5	Buffum	F., 55	O. D.	Had observed a "peculiar appearance" of the right iris for 8 years.	Cyst-like development occupying upper ⅔ of iris; in the lower part there were several brown spots.	+	0	Upper half.	Iridectomy; 3 months later enuclea. because of recurrence.	No recurrence in 18 months.	Spindle-celled.
6	Carter	M., 15	O. D. O. S.	For 3 months small specks on left iris and for 14 days on right iris.	O. D., yellow spots on outer half at margin. O. S., yellow growth half as large as pea.	Normal. . . .	Jg. 1; Jg. 1	O.D. outer ½. O. S. lower inner quad.	Iridectomy in O. S. . . .	O. S. recurred; O. D. spots so large 9 mos. after operation only large objects seen.	Round-celled.
7	Charnley	M., 16	. . .	Spot on iris noticed 11 years before.	Small growth, one-twentieth inch in diameter overlapping pupillary margin.	. . . . .	6/9	Lower and inner quad.	Iridectomy.	. . . . .	Non-pigmented spindle-celled.
8	Collins	M., 21	O. S.	Photograph taken 4 years before examination showed spot on the iris.	Brown growth.	+	6/6	Lower and inner quad.	Enucleation.	No recurrence in 17 months.	Pigmented round-celled.
9	Dreschfeld	F., 53	O. S.	Two and half years before.	Reddish-green growth the size of a split pea in lower part of iris.	+	. . . . .	Lower half.	Enucleation.	No recurrence in several years.	Non-pigmented spindle-celled.
10	Edsall	F., 23	O. S.	Two years before.	Smooth, dark gray growth, size of a split pea, covering pupillary space.	+	20/30 through a hole in center	Outer half.	Enucleation.	. . . . .	Pigmented small spindle-celled.
11	Ewetsky	M., 38	O. S.	Two weeks before	Growth in posterior part of iris pressing on the lens and pushing iris forward.	At first normal, later +	10/70	Upper half.	Enucleation.	. . . . .	Pigmented round-celled.
12	Fano	M., 19	O. S.	. . . . .	Injection of bulb; slight vascularization of the cornea and hypopyon; cornea perforated by brownish tumor.	. . . . .	0	. . . . .	Enucleation.	. . . . .	"Small regular" pigmented cells.
13	Hirschberg	M., 38	O. D.	Dark spot in iris since childh.; enlarging 1 year.	Brownish growth occupying lower two-thirds of anterior chamber.	Normal. . . .	20/30	Lower half.	Enucleation.	No recurrence in 6 months.	Pigmented spindle-celled.
14	Hosch	M., 66	O. D.	Spot observed since youth that does not enlarge.	Light brown growth occupying ⅔ of anterior chamber so that pupil shows only as a small fissure.	Normal. . . .	16/100	. . . . .	Enucleation.	. . . . .	Pigmented spindle-celled.
15	Kipp	M., 36	O. D.	Observed 12 years, growing rapidly 1 month.	Whitish growth covering a large portion of the pupil.	Normal. . . .	20/20	Lower and inner quad.	Iridectomy.	No recurrence in several years.	Non-pigmented spindle-celled.
16	Knapp	M., 36	. . .	. . . . .	Whitish growth occupied ⅓ of iris and obstructed pupil when latter was not dilated.	. . . . .	20/70	. . . . .	Iridectomy.	No recurrence in 1 year.	Non-pigmented spindle-celled.
17	Knapp	F., 35	. . .	For years blackish growth size pea in lower part iris.	For 4 years had been having attacks of iritis with transient elevation of tension.	Normal; at times +	20/100	Lower half.	Iridectomy.	No recurrence in 3 years.	Pigmented spindle-celled.
18	Knapp	M., 22	O. S.	Small specks noticed in iris 10 years before.	Yellowish red growth extending from iris into anterior chamber and studded with red dots and lines.	Normal; at times +	20/20	Lower and outer quad.	Iridectomy.	. . . . .	Non-pigmented round-celled.
19	Knapp	F., 53	. . .	Four months before examination; rapid growth.	Reddish growth as large as a cherry stone. .	Normal. . . .	L. P.	Upper and outer quad.	Enucleation.	. . . . .	Round-celled.
20	Krükow	F., 25	O. D.	Small black spot for seven years.	Fills ¼ of anterior chamber, covers half the pupil and reaches to the cornea.	Normal. . . .	Myopia, 1/36 12/30	Upper and outer quad.	Iridectomy.	No recurrence in 1 year.	Pigmented spindle- and round-celled.
21	Lebrun	F., 36	O. S.	Failing vision for 3 months. Some brown spots external part of iris the size of radish seed.	. . . . .	. . . . .	0	. . . . .	Iridect'y followed by inflam. symptoms, enucleat. performed 2 weeks later.	. . . . .	Pigmented spindle- and round-celled.
22	Limbourg	F., 7½	O. S.	Impaired vision 14 days; evidently from hemorrhage in anterior chamb.	Yellowish growth in upper part of iris reaching to the cornea.	+	Counts fingers at 1 M.	Upper and inner quad.	Enucleation.	. . . . .	Non-pigmented round-celled.
23	Little	F., 20	O. D.	Spot observed on iris after attack of sudden blind. 16 mos. before exam.; several attacks dim vision since.	Pale brown mass as large as a pea extending from margin of pupil to periphery of iris.	. . . . .	20/20	Lower and outer quad.	Iridectomy.	No recurrence in 21 months.	Pigmented round-celled.
24	Oemisch	F., 42	O. D.	Dark spot observed for six years, frequently bleeds.	Dark grayish-blue mass size of pea reaching nearly to cornea; iritis had existed.	. . . . .	5/9	Lower and inner quad.	Iridectomy.	No recurrence in 4 months.	Non-pigmented spindle-celled.
25	Pflüger	F., 55	O. D.	Spot on iris for 6 years; gradually inc. in size.	Dark brown growth connected with a smaller one in outer part of iris.	. . . . .	5/15	Lower and outer quad.	Iridectomy.	. . . . .	Pigmented spindle-celled.
26	Pflüger	F., 36	O. S.	For 10 years a small black spot on left iris, increasing slowly in size.	Growth extends from margin of pupil to angle of anterior chamber.	. . . . .	. . . . .	Lower and outer quad.	Iridectomy.	No recurrence 3 years later.	. . . . .
27	Quaglino and Guiato	F., 6	O. S.	Small growth observed for 3 months.	Two-thirds of the anterior chamber filled by tumor mass.	+	Counts fingers	. . . . .	Enucleation.	. . . . .	Pigmented spindle- and round-celled.
28	Robertson and Knapp.	F., 24	O. D.	Poor vision 1 year	Brownish growth near ciliary mar.; extending downward, still keeping to ciliary margin, chain of three smaller growths.	+	Counts fingers	Upper and outer quad.	Enucleation.	No recurrence in 2 years.	Pigmented round-celled with a few spindle-cells.
29	Romiée	F., 74	. . .	Poor vision for 34 years.	Growth occupies the whole anterior part of eyeball, involving the cornea.	. . . . .	. . . . .	Upper half.	Enucleation.	. . . . .	Pigmented small round-celled.
30	St. John	M., 50	O. S.	Black spot observed for one year.	Large brown mass filling external half of anterior chamber, pushing iris backward.	Normal. . . .	6/100 excen.	. . . . .	Enucleation.	. . . . .	Pigmented spindle-celled.
31	Sauer	F., 7	O. S.	Four months before examination.	The whole iris stroma converted into the tumor mass occupying anterior chamber.	. . . . .	. . . . .	. . . . .	Enucleation.	No recurrence in 3 years.	. . . . .
32	Schless	F., 55	O. D.	Diminution of vision for 7 weeks with inc. of tension.	Tumor in posterior chamber pushing iris forward; in ciliary region sclera 7 brown spots.	+	. . . . .	Upper and	Enucleation.		
33	Solomon			For 20 years a small spot in							

29	Romiée	F., 74		Poor vision for 34 years.	Gain, chain of three small growths occupies the whole anterior part of eyeball, involving external half of cornea.	Normal		6/100 excen.		Upper and inner quad.	Enucleation			Pigmented spindle-celled.
30	St. John	M., 50	O. S.	Black spot observed for one year.	Large brown mass pushing iris backward.					Lower and outer quad.	Enucleation	No recurrence in 3 years.		
31	Sauer	F., 7	O. S.	Four months before exam	The whole iris stroma converted into tumor mass occupying anterior chamber.					Lower half	Enucleation			Pigmented spindle-celled.
32	Schiess	F., 55	O. D.	Diminution of vision for 7 weeks with inc. of tension	Tumor in posterior chamber pushing iris forward; in ciliary region sclera 7 brown spots.	+		20/100		Upper and inner quad.	Enucleation			Pigmented spindle-celled.
33	Solomon	F., 43	O. D.	For 20 years a small spot in iris growing slowly toward pupillary margin.	Brownish growth overlapping pupillary margin.	Normal				Lower and outer quad.	Enucleation			Pigmented spindle-and round-celled.
34	Tay	M., 25	O. S.	Ten years before examination.	Grayish jelly-like mass covering pupil.			20/20		Lower half	Enucleation			"Medullary cancer with pigment."
35	Thalberg	F., 64	O. D.	Followed an operation for cataract.	Whitish growth filling anterior chamber; secondary cataract.	+		0			Operation for secondary cat. followed by enucleation.			Non-pigmented round-and spindle celled.
36	Veasey	M., 46	O. S.	Photograph taken 8 years showed dark spots on iris.	Severe iritis; small brown growth pushing backward on lens.	Normal		5/27		Upper and inner quad.	Iridectomy	No recurrence in 21 months.		Pigmented small round-celled.
37	Verter	F., 72	O. D.	Growing rapidly 3 weeks.	Occupying periphery of iris and lying against cornea; over-ripe cataract.			0			Enucleation			Pigmented spindle-celled.
38	Verter	F., 60	O. D.	Had observed spot on iris for several weeks.				2/5			Enucleation			Pigmented spindle-celled.
39	Walker	F., 59	O. S.	A few weeks before examination.	Pinkish growth filling pupillary space resembling secondary cat.; iris rotten growth obliterating anterior chamber.						Discission, followed 3 weeks later by enucleation.			Small spindle-celled.
40	Webster and Van Gleson	F., 60	O. S.	For 4 weeks a "purple mist" before the eye.	Growth about the size of a small pea	+		20/70		Lower and outer quad.	Enucleation			Pigmented spindle-celled.
41	Werther	F., 72	O. D.		Brownish-black semi-globular tumor size of a hemp seed.					Lower and outer quad.	Enucleation			Pigmented spindle-celled.
42	Werther	F., 60	O. D.	Few weeks before examination.	Brownish-black semi-globular tumor size of a hemp seed.			Hm. 1.50 D. 2/5		Lower and inner quad.	Enucleation			Spindle-celled, part pigmented, part non-pigmented.
43	Whiting	M., 49	O. S.	Spot observed on left iris since 10 years of age.	Severe ocular pain and inflammation; large dark brown growth occupying lower part of anterior chamber.	Normal at first later +		At first 20/70; later 0.		Lower and inner quad.	Enucleation		6	Pigmented mixed-celled, the round predominating.
44	Wiegmann	F., 42	O. D.	Dark tumor on iris at birth; unchanged for 42 years.	Round brownish growth increasing rapidly in size for 7 months.	Normal		5/5		Lower and outer quad.	Iridectomy; galvano-cautery to dark spot in wound 9 mo. later	No recurrence in year.	1	Pigmented spindle-celled.
45	Williamson	F., 14	O. S.	Six months before examination.	Growth reaching to pupillary margin; begun in periphery.					Lower and outer quad.	Iridect.; 3 days later enucleation, growth attached by deep adhesions.	No recurrence in years.	2	Non-pigmented spindle-celled.
46	Zellweger	F., 75	O. D.	For long time small spot on iris; rap. growth for 6 wks	Pale pink vascular growth in lower part of iris and incipient cataract.	Normal		Counts fingers at 2½ M.		Lower half	Iridectomy	No recurrence in months.	6	Non-pigment. small spindle-celled.

ination showed a brownish tumor in the upper and outer part of the iris at the ciliary margin, and extending downward from this a chain of three smaller growths still keeping to the ciliary margin. Vision equaled the counting of fingers and the tension was elevated. Enucleation was performed and microscopic examination showed the growth to be a pigmented round-celled sarcoma with a few spindle-cells here and there. There had been no recurrence at the expiration of two years. The origin was supposed to have been from the anterior layers of the ciliary portion of the iris.

Case 29.—Romiée. This patient was a female, aged 74 years, who had not been very well since she was 40 years of age. Examination showed an irregular growth occupying the whole of the anterior portion of the bulb, the cornea being involved. Enucleation was performed and the growth was a pigmented, small, round celled sarcoma that had its origin in the upper half of the iris. The retina was found detached, but the lens, choroid and sclera were unaffected. The growth had pierced the cornea in the upper part.

Case 30.—St. John. A male, 50 years of age, had noticed a black spot on the left iris for one year. The tension was normal and the vision equaled $^{6}/_{100}$ eccentrically inward. There was a large brown mass filling the external half of the anterior chamber and pushing the iris backward. Pressure on the cornea in front had caused a "hazy spot." The bulb was enucleated and the growth was a pigmented spindle-celled sarcoma.

Case 31.—Sauer. The patient was a female, 7 years of age. Four months before, there had been observed a growth on the left iris that had been rapidly increasing in size. At the time of operation the whole stroma of the iris seemed to have been converted into a tumor mass that occupied the whole anterior chamber. Enucleation was performed and the growth was a mixed-celled sarcoma, consisting of round and spindle cells. No recurrence had taken place at the expiration of three years.

Case 32.—Schiess. This case is a most interesting one. A female, 55 years of age, had noticed a gradual failure of vision of the right eye for seven weeks. There were also temporary attacks of increased intra-ocular tension. At the time of examination a tumor was found in the posterior chamber pushing the iris forward. There were also seven large and small brownish spots in the ciliary region of the sclera. The eye was not sensitive nor was there any pain or irritation. The bulb was enucleated and microscopic examination showed that the ciliary body contained a true melanoma, while the growth in the iris was a pigmented spindle-celled sarcoma. The latter was supposed to have been secondary to the first and originated in the upper and inner quadrant of the iris.

Case 33.—Solomon. A female, 43 years of age, had noticed a small brownish speck about as large as a pin's head on the outer ciliary margin of the right iris twenty years before. It had been gradually increasing in size and growing toward the pupillary margin, which it overlapped at the time of the operation. The tension was normal and vision equaled $^{20}/_{100}$. The lens was clear but the vitreous cloudy. Enucleation was performed and the growth proved to be a pigmented round and spindle-celled sarcoma, some cells having passed into the sclera, following the course of Schlemm's canal.

Case 34.—Tay. A male, aged 25 years, had observed a peculiar growth on the lower half of the left iris for ten years. There was a grayish jelly-like mass with opaque points scattered through it covering the pupil. The vision remained normal until the pupil was covered by the growth. The eye was enucleated and the microscopic description of the growth was that of a "medullary cancer with pigment," which in all probability was a sarcoma.

Case 35.—Thalberg. The patient was a female, aged 64 years. Following the extraction of cataract and looking very much like a secondary cataract, there developed in the anterior chamber filling the pupillary space and involving the iris a whitish growth. The cornea became somewhat thickened, the tension was increased and vision was totally destroyed. The growth looked so much like a secondary cataract that an operation for the latter was performed. Pain persisted, however, and the growth increased in size so that enucleation was finally performed. The whole iris was found to have been involved by a non-pigmented sarcoma composed of large and small round, spindle and polygonal cells. The growth had its origin in the endothelial cells of the iris.

Case 36.—Verter. A female, 72 years of age, possessed a dark brown tumor of the right iris about the size of a hempseed, involving the peripheral portion of the iris and lying closely against the posterior surface of the cornea, occupying about one-third of the anterior chamber. There was present an over-ripe cataract and the eye was blind. There was no pain nor irritation, and the patient could give no account of the growth. The eyeball was enucleated and sections of the

tumor showed it to be a pigmented spindle-celled sarcoma. The ciliary body, the spaces of the pectinate ligament, the venous plexus and the equator of the lens were all secondarily involved.

Case 37.—Verter. This patient was a female, aged 60 years, who had observed some weeks before a small dark, cinnamon-colored growth upon the right iris. The media were transparent and the visual acuity equaled $\frac{2}{5}$ with + S 1.50 D. The vision of the left eye was normal with + S 1.50 D. Iridectomy had been advised at the time of first observation of the growth, but at the time consent to the operation was obtained the size was so much increased that enucleation was performed. The tumor was a pigmented spindle-celled sarcoma, and had secondarily involved the ciliary body, Schlemm's canal, Fontana's spaces and the cornea. A small cyst was also found in the periphery of the retina.

Case 38.—Walker. Patient was a female, aged 59 years, who had a cataract extracted from the left eye three years before without iridectomy. For a time before the examination the vision had been failing in this eye. There was no pain or inflammatory symptoms, but inspection showed a pinkish growth filling the pupillary space and strongly resembling secondary cataract. Discission was performed without benefit, the iris being rotten and adherent to the capsule. Three weeks later the eye was enucleated and the mass found to be a small spindle-celled sarcoma. Before enucleation the growth had extended to the cornea in front, obliterating the anterior chamber and looking very much like a large dislocated lens.

Case 39.—Webster and Van Gieson. The patient was a female, aged 60 years. For four weeks she had seen a "purple mist" before the left eye. There was found a growth about the size of a small pea in the lower and outer quadrant of the iris. The tension was elevated and the vision equaled $\frac{20}{70}$. There was also present anterior polar cataract and edema of the retina. Enucleation was performed and the growth was found to be a pigmented spindle-celled sarcoma.

Case 40.—Werther. A female, aged 72 years, had a brownish-black semiglobular tumor about the size of a hemp-seed, in the lower and outer quadrant of the right iris. Enucleation was performed and the growth was found to be a pigmented spindle celled sarcoma.

Case 41.—Werther. A female, aged 60 years, had observed a few weeks before a semiblobular, brownish-black tumor of the right iris about the size of a hemp-seed. There was a hypermetropia of 1.50 D., and the vision equaled $\frac{2}{5}$. The growth was situated in the lower and inner quadrant. The eyeball was removed by enucleation and the growth proved to be a spindle-celled sarcoma, part pigmented and part non-pigmented. There was also found a cyst formation in the periphery of the retina.

Case 42.—Whiting. The patient was a male, aged 49 years, who had observed a spot on the left iris since 10 years of age. Several years before he had consulted Dr. Knapp, and at that time the eyeball became occasionally inflamed and there were hemorrhages into the anterior chamber. At the present examination there was a dark brown growth filling the entire lower inner quadrant of the anterior chamber, covering the inferior internal margin of the pupil, which was oblong. There were no synechiæ. The cornea was slightly hazy from contact at several points. Vision of the right eye equaled $\frac{20}{20}$; of the left, $\frac{20}{70}$. Nine years later the patient returned on account of severe ocular pain and inflammation of the eyeball, which was now totally blind. The tension was elevated. Enucleation was performed and the growth was a pigmented mixed-celled sarcoma, the round cells predominating. The choroid had become secondarily involved and contained a true bony formation.

The case is exceedingly interesting, as the growth was watched for a long time, being observed at ten years of age, remaining harmless for twenty-five years, slowly growing for thirteen years with occasional attacks of iritis and hemorrhages into the anterior chamber for seven years there being no doubt as to its malignancy. The patient refused earlier operative interference. There had been no recurrence at the expiration of six months.

Case 43.—Wiegmann. The patient was a female, aged 42 years. At birth there was observed a dark tumor about $\frac{2}{5}$ mm. in diameter on the lower and outer quadrant of the iris, that had remained unchanged until seven months before the examination, when it began to enlarge. The tension was normal and vision equaled $\frac{5}{5}$. Iridectomy was performed and was followed nine months later by the application of the galvanocautery to a dark spot in the wound. This was repeated in about two weeks. The tumor was a pigmented spindle-celled sarcoma and no recurrence had been noted at the expiration of one year.

Case 44.—Williamson. This patient was a female, 14 years of age. Six months before, there had been noticed on the lower and outer quadrant of the left iris a yellowish spot. At the time of the examination the growth reached to the pupillary margin, having begun in the periphery. An attempt was made to remove the tumor by an iridectomy, but this was followed, three days later, by enucleation of the eyeball as the growth was found to be firmly attached by deep adhesions. Microscopic examination showed it to be a non-pigmented spindle celled sarcoma.

Case 45.—Zellweger. A female, aged 75 years, had noticed a small spot on the right iris for a long time. During the six weeks preceding the examination it had been growing very rapidly. There had been no pain or inflammatory symptoms at any time. The examination showed a pale, pinkish, vascular growth in the lower part of the iris, and beginning cataract. The tension was normal and the vision equaled the counting of fingers at $2\frac{1}{2}$ M. The growth was removed by iridectomy and was a non-pigmented small spindle-celled sarcoma originating from the anterior layers of the iris. There was no recurrence *in situ* in six months, but as the patient had some loss of appetite the author questions whether a recurrence had taken place by metastasis. Of this there was no later proof.

Arlt refers to two cases from whom the growth was removed by iridectomy, and to a third case requiring enucleation of the eyeball. In neither were there any details of the histories, either prior or subsequent to the operations.

Fuchs, in the discussion of a paper, refers to a case of primary sarcoma of the iris for which the eyeball was enucleated, but the details of the history are too meager to be of any use.

Cases in which primary sarcoma of the iris was diagnosed but which were not operated upon, are recorded by Berthold, Fuchs, Galezowski, von Graefe, Hasner, Owen, Pflüger, Saltzmann, St. John Roosa and Stober.

In order that the cases may be more easily analyzed, and to facilitate reference to any particular point in connection with them the accompanying table has been prepared somewhat after the manner of Fuchs. It will be seen therefore from the above that there have been recorded forty-six cases of primary sarcomata of the iris in which operative procedures have been undertaken and microscopic examinations made. Of these cases we have fourteen males, thirty-two females, giving, in round numbers, 69.5 per cent. of females and 30.5 per cent. of males.

The ages range as follows: From 1 to 5 years, one case; from 6 to 15 years, six cases; from 16 to 25 years, nine cases; from 26 to 35 years, 1 case; from 36 to 45 years, ten cases; from 46 to 55 years, nine cases; from 56 to 65 years, five cases; 66 to 75 years, five cases.[1]

By referring to the above it will be seen that between the ages of 15 and 25 inclusive there occurred ten cases, and between 35 and 45 inclusive there occurred eleven cases, whereas the intervening period, from 25 to 35, contained only one case. There seem, therefore, to be two periods during which the disease is most likely to manifest itself, viz., between the ages of 15 and 25 and between the ages of 35 and 45, with a very moderate increase of predisposition in favor of the latter period, the intervening period, that is from 25 to 35 being almost free from the affection, as only

[1] If instead of analyzing the ages according to decades, we take 5-year periods, the age of predisposition can be reduced even further, still conforming with the statistics of the above tables. From 1 to 5 years, one case; from 6 to 10 years, three cases; from 11 to 15 years, three cases; from 16 to 20 years three cases; from 21 to 25 years, six cases; from 26 to 30 years, no cases; from 31 to 35 years, one case; from 36 to 40 years, six cases; from 41 to 45 years, four cases; from 46 to 50 years, four cases; from 51 to 55 years, five cases; from 56 to 60 years, four cases; from 61 to 65 years, one case; from 66 to 70 years, one case; from 71 to 75 years, four cases. It will be seen, therefore, according to this, that from 20 to 25 and from 35 to 40 years of age afford the periods of greatest predisposition. This result entirely agrees with that obtained from the first table, the former, perhaps, being slightly more accurate as it affords a greater range.

one of the forty-six cases occurred during this time. Beyond the age of 45 the predisposition decreases very gradually and *vice versa*, the nearer we approach this age the greater becomes this predisposition.

It must be considered, however, that the above figures represent in many cases the ages at which the patients were operated upon. But as the greater number of cases were operated upon shortly after coming under the observation of the various authors, and as most of them came under observation shortly after the growths in the iris were discovered, the two periods given represent quite fairly the decades of greatest predisposition.

The youngest case in the list was 2 years of age and the oldest 75 years of age, the average age being 39.3 years.

It is to be noted also that seventeen of the cases occurred before the 35th year and twenty-nine after the 35th year; or, if the 40th year be taken as the dividing line we have an equal number on either side, namely, twenty-three.

As to the ages when the growths were first observed to be in an active state, it is impossible to give any definite statistics. The larger number of patients consulted surgeons within a short time after the discovery of the affection, but it must be remembered that many of the growths have the history of originating from apparently dark tumors of the iris, melanomata, which after remaining in a state of quiesence for many years assumed a malignancy that microscopic examinations afterward proved to be sarcomata.

We find that the left eye has been more frequently affected, though the difference in predisposition is not marked, the actual ratio being as follows: Right eye affected in nineteen cases; left eye affected in twenty-one cases; both eyes affected in one case; not stated in five cases.

The tension as given in the histories is as follows: Normal in eleven cases: elevated in sixteen cases; not stated in nineteen cases.

In five of the cases given as "elevated" the histories state that the tension was normal as a rule, but at times elevated. Thus of those cases in which the condition of the tension is recorded we have 40.7 per cent. normal, 40.7 per cent. elevated and 18.6 per cent. as varying, being sometimes normal and sometimes elevated. This differs somewhat from the recently published statistics of Devreaux Marshall, who has found in intra-ocular neoplasms affecting the iris or ciliary body that the tension is increased in 35.71 per cent. diminished in 14.28 per cent. and normal in 50 per cent. As his cases were not, however, exclusively primary growths of the iris, but growths affecting either the ciliary body or the iris, or both, being primary and secondary, the difference may be easily accounted for. In no one of the cases of primary sarcomata of the iris was the tension stated to have been diminished.

The condition of the visual acuity in these cases ranged thus: Normal in nine cases; 20/100, or better, in fourteen cases; less than 20/100 in eight cases; light perception in two cases; blind in six cases; not stated in eight cases.

In some of the cases the lens was more or less cataractous (Alt's, Knapp's, Oemisch's, Verter's and my own). In the latter case, after the extraction of the lens the patient obtained vision equal to 5/6 and easily read Jaeger 1.

The positions occupied by the tumors on the surfaces of the irides are variously given as follows: Lower and inner quadrant, seven cases; lower and outer quadrant, eleven cases; upper and inner quadrant, three cases: upper and outer quadrant, three cases; lower half, five cases; upper half, three cases; outer half, two cases; not stated, thirteen cases.

Of the thirty-two definitely stated cases we have, therefore, twenty-three cases, or 71.8 per cent. orignating from the lower half of the iris, and nine cases, or 28.2 per cent. originating from the upper half of the iris. There seems also to be a somewhat greater predisposition to occur in the outer portion of the lower half, or in the lower outer quadrant of the iris.

The operations that were performed in the recorded cases were: Enucleation in thirty-two cases; iridectomy in fourteen cases. In the above thirty-two cases under the heading "enucleation" are included four cases in which iridectomy was first performed and in which enucleation was subsequently required. In Andrews' case, enucleation was performed a week after the iridectomy, because of suppuration of the globe; in Lebrun's case it was performed two weeks later because of "inflammatory symptoms" in the globe; in Williamson's case three days later, because the iridectomy disclosed the fact that the growth was attached by "deep adhesions;" in Buffum's case three months later, because of recurrence. In Carter's case the growth recurred, but it was so distinctly unfavorable that nothing else could have been expected. So that we have out of forty-six cases operated upon, the successful removal of the growth in thirteen cases, by iridectomies, in which no recurrence is recorded during the time they remained under observation, which varied from four months to many years. In none of the enucleations are recurrences positively recorded, but in one (Zellweger's case) a loss of appetite with some gastro-intestinal disturbance was looked upon as probably the beginning of a metastatic process, though no subsequent mention is made of it.

The histologic examinations of the growths showed that twenty-seven were pigmented, ten cases were non-pigmented, and nine cases not definitely stated.

It seems somewhat odd that in a tissue so highly pigmented as the iris we should have a non-pigmented growth, yet in the thirty-seven cases definitely recorded we have in round numbers 27 per cent. of the non-pigmented variety and 73 per cent. of the pigmented variety.

As to the cellular formation of the growths we have twenty-three cases of spindle celled; eleven cases of round celled; seven cases of mixed celled; five cases not definitely stated.

This, in round numbers, places in the spindle celled classification 56 per cent.; in the round celled classification 27 per cent, and in the mixed celled classification 17 per cent. of the reported cases.

Symptoms.—From a study of the recorded cases it is seen that primary sarcoma of the iris may occur at almost any age, the youngest being 2 years, the eldest 75 years of age, the periods of greatest predisposition being between the 15th and the 25th, and between the 35th and the 45th years. As a rule it is first observed as a spot of discoloration upon the iris, which, after a period of quiescence varying from a few weeks to many years, begins to increase rapidly in size, interfering with vision according to the degree of inflammation it has caused and the amount of pupillary space covered. Vision is also sometimes obscured for short periods of time by transient increase of the intra-ocular tension or by hemorrhages from the growth

into the anterior chamber. Sooner or later it is apt to produce iritis and by pressure backward to cause opacity of the capsule and lens. Tension is presumably increased when the growth attains sufficient size, or has brought about sufficiently violent inflammation to interfere with the interchange of the ocular fluids. If left to itself it attains considerable size, perforating the external coats of the eye, and usually produces blindness. It occurs twice as frequently in females as in males, each eye seems to be equally predisposed and the favorite position seems to be in the lower half, and especially in the lower and outer quadrant of the iris.

Diagnosis.—Primary sarcoma of the iris may be mistaken for simple melanoma, for gumma, or for primary tubercle of the iris.

A simple melanoma becomes darker and darker while a melano-sarcoma ordinarily retains its primary shade. A melanoma is also a congenital growth while sarcoma is not. If the patient, or patient's family, can give no accurate information on this point the growth must be watched for some time to note if there is any progress (Fuchs).

Whenever a gumma of the iris appears there is a severe iritis, whereas in the early stage of sarcoma of the iris there are no inflammatory symptoms. In gumma of the iris, also, there is a specific history with other symptoms referable to syphilitic infection.

The color of the gumma is either an iron-red or deep yellowish-red, while that of sarcoma is reddish-gray, blackish or light brown, or flesh-color (Andrews.) Gumma is non-vascular and yellowish-white in color at the summit, but at the base it is vascular and has a yellowish-red border (Fuchs). If the diagnosis can not be positively made from the examination, the administration of anti-syphilitic remedies, for a short time, in large doses will clear up the matter.

Tubercle of the iris is of much more rapid growth than sarcoma and in color is of a light yellowish-white, or light grayish-white, or light grayish yellow (Andrews). As a rule no vessels are seen on its surface, whereas in sarcoma superficial vascularization can usually be detected. The larger number of cases of tubercle have occurred in subjects under 15 years of age, whereas the larger number of cases of sarcoma have been found in older persons. Tubercle is much more irregular in form than sarcoma and the accompanying inflammatory symptoms also appear earlier.

Treatment.—If the growth is sufficiently small and does not extend to the extreme ciliary portion of the iris an attempt should be made to remove it by an extremely broad peripheral iridectomy. The statistics conclusively prove that in many cases not only has the eyeball been preserved but with useful vision, and that no recurrence has been noted years after the removal of the growth by this operation. If the growth, however, is so large or is situated so near the ciliary margin of the iris that it is impossible to remove all of it by an iridectomy, or if any other portion of the eye has become secondarily involved, immediate enucleation should be performed.

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DISCUSSION.

Dr. HOWARD F. HANSELL of Philadelphia—My remarks on

this interesting addition to the literature of primary sarcoma of the iris concern chiefly the differential diagnosis between this and other forms of tumor of the iris and ciliary body as I have had opportunity to observe them in my practice. These affections, with the exception of tumors of syphilitic origin, are among the rarest of eye diseases and it is only by a collation of individual experiences rather than by the classic and oft repeated dicta of any one writer that advance may be made in our knowledge. Until very recently I believe it was the common impression that sarcoma of the uveal tract was a distinctly fatal disease, but the paper of Mathews and the discussion that followed it showed conclusively that in many cases it was years before enucleation was necessary. The slowness of growth may be attributed to the serous sac that in cavities that have serous linings, forms over the tumor and prevents involvement and disintegration of neighboring structures. Eventually this envelope becomes attenuated to such a degree that it is no longer able to sustain the pressure from within and, rupturing, the sarcoma cells find new soil for development. Two cases exhibited this winter by Carpenter and Perrine, before the Section on Ophthalmology of the College of Physicians of Philadelphia, had been of extremely slow growth and enucleation was finally resorted to in order to relieve the pain of secondary glaucoma rather than because the tumors showed a tendency to spread. Identical grounds for treatment prevail when the tumor is recognized as belonging to the so called benign variety, and we may therefore infer that primary sarcoma of the uveal tract is *per se* not an especially malignant affection.

The diseases that most closely resemble sarcoma of the iris are fibroma, cyst, gumma and primary tuberculosis; yet in none of these should the diagnosis long remain uncertain, particularly after operative interference. Considered clinically only, a fibroma offers the following points of difference: It occurs as a rule in young patients as the result of traumatism, and is not a result of inflammatory exudation although it often gives rise to inflammation; the color is that of the iris stroma or darker; it is oblong in shape and shows a tendency to extend by increase in the area of its base and not by layers of deposit; its surface is rough, presenting a strong contrast to the smooth encapsulated shining surface of the sarcoma. It is non-vascular except when the associated iritis is of high grade; exacerbations of iritis are common, hence posterior synechiæ, not limited to the site of the tumor although secondary to it, are numerous. Vision is interfered with according to the situation, size, rate of growth and the degree of transparency of the anterior capsule. Family history in the cases I have seen did not enter into a consideration of the diagnosis. In sarcoma there is perhaps a family history of tumor, the patients have reached middle age; the outline is sharp and well defined, the surface is smooth and shiny to oblique illumination and its form round and, if old, nodulated; the pupil dilates irregularly, the non involved portion of the iris dilating to light and mydriatics while the portion adjacent to the tumor is adherent to the anterior capsule.

In cyst a history of traumatism can invariably be elicited; the tumor grows rapidly, soon coming into contact with the cornea anteriorly and dislocating the lens posteriorly; there is no iritis and but little interference with vision until adjoining parts are disturbed in their function; it is pearl color, non-vascular and painless, its outer limiting membrane is fibrous and its inner is serous in its nature; its contents is straw-colored, nearly transparent and semi-fluid. Thus in nearly every essential it differs from sarcoma.

Gumma is always associated with and causatively related to the iritis of secondary or tertiary syphilis. In color, in intensity of inflammation, in the presence of hypopyon or collections of broken-off necrosed masses of the tumor in the anterior chamber, in the severity and character of the pain, in the loss of vision and in the history, it offers few points of resemblance to sarcoma. In primary tuberculosis the iris is dotted in numerous places with small deposits, averaging the size of a pin's head, of somewhat lighter color than the healthy iris tissue. In the only case that has fallen under my observation it appeared in the early childhood of the offspring of a tuberculous parent. The vision was reduced to the perception of light, and there were no signs of inflammation.

One point of interest common to all cases of tumor either of the iris or other tissues of the eye, may be mentioned. I refer to the intra ocular tension. I have found tension to be unaltered until the late stages, when I have regarded the increased pressure to be the result of secondary glaucoma and not to an increase in the contents or to a change in their character but to a disturbance of the relation between secretion and excretion. If perforation of the coats of the ball has taken place, high will naturally be succeeded by low tension and such a succession would indicate an advance in the growth.

A DUCTION INDICATOR AND PHOROMETER COMBINED.

Presented to the Section on Ophthalmology at the Forty-eighth Annual Meeting of the American Medical Association, held at Philadelphia, Pa., June 1-4, 1897.

BY A. E. PRINCE, M.D., PH.D.
SPRINGFIELD, ILL.

In 1892 I conceived the idea of simplifying the determination of the static relation of the optic axes by placing a Maddox rod behind two rotating prisms, thus avoiding the necessity of employing a series of prisms, and presented this conception in a paper read before the Ophthalmological Section of the AMERICAN MEDICAL ASSOCIATION, at Detroit. In 1893 this idea was embodied in my phorometer published in the *Archives of Ophthalmology*. This conception has been adopted by Wilson in the construction of his instrument. The dial is so graduated as to indicate the combined effect of the two prisms in every possible relation to one another, and each quadrant of the dial is lettered to indicate the character of heterophoria. In testing for hyperphoria, the index will point to R.H., L.H., or 0, denoting the degree of right or left hyperphoria, or the existence of neither. Similarly in observations relative to esophoria or exophoria, the index will point to Ex., Es., or 0, denoting the degree of exophoria, esophoria or the absence of either of these conditions.

Prompted by the successful operation of this instrument in determining the static relation of the recti muscles, Bonschur & Holmes in 1894 made, at my suggestion, an instrument for determining the dynamic capacity of the recti muscles. The prism employed had a strength of seven and a half degrees, thus furnishing every possible prism from 0 to 15 degrees. The graduated quadrants were lettered respectively Ad., Ab., R. S., and L.S., to indicate adduction, abduction, right sursumduction and left sursumduction. This instrument was presented to the profession through the *Ophthalmic Record*, July 1894, under the title of "A Duction Indicator and Developer."

The third step in the evolution is the use of a Maddox multiple red rod in place of a single rod, thus avoiding the necessity of centering the instrument

before the eye, which was the case with the original phorometer.

The fourth step in the evolution completes the instrument which I offer you today. It consists of two seven and a half degree prisms mounted in a circular metal frame and caused to rotate in reverse directions; in this manner every possible degree may be obtained.

The direction of the base of the resultant prism is always in a line transverse to the diameter joining the two zero points, and the strength is always indicated on the margin of the frames opposite the middle point of the base of the prism. Behind this variable prism is placed a Maddox multiple red rod, the axis of which is transverse to the diameter joining the zero points.

In testing the relation of the recti muscles, the instrument is first used as a phorometer, for by so doing the static (or rest) condition may be obtained before any spasm shall have been induced by the requirement of the muscles to overcome prisms.

In testing exophoria and esophoria the instrument is held by the observer, before the right eye and rods, horizontal dial out, and the patient is directed to look at a candle flame placed on a level with the eye and before a dark background. The pinion is then rotated until the vertical red image of light is seen superimposed over the candle flame. The quadrant occupied by the base of the prism will indicate either esophoria or exophoria, and at the point where the middle of the base of the prism cuts the quadrant will be found the degree of heterophoria.

The rods are then rotated into the vertical position when the red streak will be seen in the horizontal plane; when this is brought in line with the flame the amount and character of the hyperphoria when it exists will be indicated on the quadrants corresponding to hyperphoria.

Having ascertained the relation of the optical axes in a state of rest the efficiency of the various muscles to overcome prisms is ascertained by converting the instrument into a duction indicator and proceeding as follows: The multiple red rod having been removed the instrument is held before the right eye as before. The diameter corresponding to the zero points occupy the vertical plane in testing adduction and abduction; the horizontal plane in testing right and left sursumduction. The pinion is rotated until diplopia results, when the amount of prism deviation is read off on the corresponding quadrant indicated by Ad., Ab., R.S. or L.S. In testing R. and L. S. and abduction the prismatic amplitude being fifteen degrees it is usually sufficient, but in testing adduction an auxiliary prism is required.

Auxiliary prisms may be placed in a trial frame, but to economize time and avoid any possible obliquity of the axis, I place before the eyes an ordinary frame in which is mounted two ten-degree prisms base out. The duction indicator will now have an amplitude of from five to thirty-five degrees depending on whether the action of the variable prism acts in conjunction or opposite to the stationary prisms.

The duction indicator and phorometer, as I present it to you today, has been in daily use during the past three years, and I have made numerous comparisons between it and Gould's prism battery, both for determining maximum abduction and adduction, as well as cultivating the capacity of the muscles to overcome prisms of a greater and greater strength, and almost invariably the duction indicator has shown a superiority over the prism battery. This superiority is due to the fact that the increment of increase is infinitesimal, while the increment of increase with Gould's prism battery is two degrees, e. g., in ascertaining the maximum adduction, the patient gets to a point where the overcoming of two degrees in the ascending series is more than the muscles will accomplish, and diplopia, therefore, results. In the use of the duction indicator, turning the pinion slowly, a fraction of a degree is all the muscles are obliged to overcome, and the patient is gradually enabled to exercise the muscles to a greater extent before diplopia asserts itself. In the effort, therefore, to obtain a maximum capacity of the recti muscles in their effort to overcome prisms, the duction indicator is undoubtedly an instrument far superior to any prism battery.

A CLINICAL STUDY OF HYPERPHORIA.

BY JOHN T. CARPENTER, JR., M.D.

Read in the Section on Ophthalmology, at the Forty-eighth Annual Meeting of the American Medical Association held at Philadelphia, Pa., June 1-4, 1897.

PHILADELPHIA, PA.

The importance of recognizing and correcting with absolute accuracy, any existing error of refraction, has long since become an axiom, a truth too evident to require demonstration. In the past decade, mainly as a result of careful clinical study, errors of muscular balance have been attracting the attention of the ophthalmic surgeon; but in this field there still exist wide differences of opinion both as to the importance of muscular defects and the necessity for their treatment. One may find almost anything desired by searching the literature of this subject. If he be naturally conservative he may read of that wonderful and unfailing "cure-all" for muscular imbalance, prismatic exercise. The method of cure is both simple in its application and positively harmless. It is even monotonous in the uniformity of its good results. On the other hand, should the ophthalmologist be surgically inclined; should his desire be to refute the base insinuation that he is a mere "fitter of glasses;" he can find enthusiastic advocates of a measure apparently no less magic in its results, tenotomy of the ocular muscles. There is discord in regard to the prescribing of prisms in the position of rest, a procedure which according to some will transform orthophoria into heterophoria, and increase the amount of heterophoria already existing. Certainly there is need of a more satisfactory presentation of this entire subject of muscular abnormalties, and in passing I wish to mention the excellent work done in this direction by Duane whose valuable contributions in the *Annals of Ophthalmology* (Vols. v and vi), deserve the highest commendation. Risley has put himself on record as an advocate of a more scientific classification of motor anomalies (*University Medical Magazine*, January, 1895).

Hyperphoria is not rare, if by it we mean the tending of one visual axis above that of its fellow. From my case-books I find it in about 35 per cent. of my cases, as discovered by the Maddox rod at the first visit. By no means all of these are true hyperphoria or demand treatment. In these are included cases of hyperphoria combined with esophoria or exophoria as well as those which may justly be termed spurious hyperphoria dependent upon disturbed refractive or muscular conditions and disappearing after these have

been corrected. I have notes of cases in which a change made in the axis of the cylinders in astigmatism resulted in the disappearance of the hyperphoria. (Such cases have also been seen by Risley, *loc. cit.*) I have attributed this kind of hyperphoria to the spasm of the oblique muscles set up by the false position of the cylinder. Spasm of the obliques might readily cause hyperphoria, especially when of variable nature or degree. In these cases prisms in position of rest only aggravate the conditions and result in gradual increase in the amount of the vertical error.

It is important to remember that besides the mere existence of muscular anomalies we must consider their relation to other local ocular states, refractive and accommodative, as well as to general systemic conditions. It is a matter of clinical observation that gouty or rheumatic muscles can closely simulate the clinical picture of heterophoria, and many errors in treatment, notably surgical treatment, are caused by too little regard for this fact. Our efforts should be directed toward the study and arrangement of this subject into definite clinical groups, having a similar causative relation and, therefore demanding a similar and definite line of treatment. It is the lack of this which has brought discredit upon tenotomy as a method of treatment, and much of the uncertainty in, and many of the apparently contradictory results of, tenotomy would be avoided were the anatomic and physiologic questions involved more carefully and accurately studied.

Classification.—For teaching purposes and as an aid to the clinical study of hyperphoria I have adopted the following classification, which though by no means perfect possesses to my mind distinct practical advantages. It avoids the confusion arising from a merely symptomatic arrangement in which cases widely dissimilar in nature are yet grouped together because they reveal a similar tendency to divergence, convergence or vertical deviation.

1. Spurious Hyperphoria. Including:

A. Hyperphoria due to a general disease: gout, rheumatism.

B. Hyperphoria appearing in disease of central nervous system.

C. Hyperphoria secondary to abnormal refractive or muscular states.

2. True Hyperphoria. Including:

A. Concomitant.

B. Spasmodic.

C. Paretic.

Symptoms of hyperphoria include local or ocular, and remote or general symptoms. My case-books show among the ocular disturbances due to hyperphoria:

1. Affections of the lids. The most characteristic is chronic palpebral hyperemia or inflammation, with intense burning pain, as in the "hot eye" of gout and blepharitis; recurring attacks of hordeoli or chalazia, usually in the eye in which the muscle is at fault, seem to be truthfully attributable to hyperphoria, as they have in several cases been cured by correction of the hyperphoria by prism or operation.

2. Reflex ocular neuroses, e.g., epiphora of a very annoying character, photophobia. In one case a quite marked ptosis of the left eye with hyperphoria of 5 degrees almost entirely disappeared after correcting the hyperphoria.

3. Visual disturbance: Amblyopia of the hyperphoric eye (Stevens); transient diplopia which to my mind accounts for most of the inability to carry on work at a near point; ocular vertigo sometimes severe enough to simulate intra-cranial disease.

4. Muscular asthenopia due to defects in the lateral muscles resulting from effort to correct the vertical error.

The remote symptoms include: Severe headaches made worse by close work; general reflex derangements of the nervous system often most remote from the ocular seat of trouble; nausea and various symptoms whose disappearance after correction of the hyperphoria leads the clinician to infer that they were caused by the muscular defect. No justification exists for the treatment of hyperphoria from which the patient suffers no discomfort and of whose existence he is "sublimely unconscious."

Tests for the determination of hyperphoria.—I find the optometer and phorometer devised by Risley, with two rotary prisms, one fixed for the vertical and the other for lateral muscles, the most satisfactory form of apparatus. I should certainly hesitate to accept results gained by the use of the ordinary trial-frame and prisms in *approximately* accurate positions. The familiar test with the Maddox rod and small point of light reveals any tendency to hyperphoria in most cases. I wish to lay particular stress upon the value of the plane red glass placed before one eye, which gives many valuable hints as to binocular vision, its existence and the conditions under which enjoyed. The cover test slightly modified by allowing the covered eye to be excluded from the binocular vision for some moments will, in hyperphoria give blurred distant vision or even vertical diplopia for the smaller letters, which diplopia is always indicative of the nature and character of the hyperphoria. The value of the field of fixation and the tropometer of Stevens is certainly great in enabling the surgeon to arrive at a complete understanding of the conditions present in the neuro-muscular system of the eyes. Having ascertained the existence of hyperphoria it is necessary to determine its true nature. Just as we refer departures from the standard refractive condition, emmetropia, to that ideal so must we have a standard for cases of muscular anomalies. I feel sure that standard as regards the vertical muscles is a condition of equilibrium at 6 m. as revealed by the tests herein enumerated. The vertical muscles should in health be able to overcome the diplopia caused by 2°–4° prism held vertically. Normal muscular balance certainly means a condition of tension of the extra-ocular muscles with power to bring both visual axes promptly into line on the object viewed. Defects of refraction with their compensatory accommodative and muscular efforts must be eliminated by a careful measurement under a cycloplegic and the correction by properly ground and accurately centered lenses made of all important defects, which in my judgment include small amounts of astigmatism. It is important to decide whether the hyperphoria is produced by a general or local cause; neurasthenia, lowered vitality during convalescence from an illness or surgical shock; gouty or rheumatic inflammatory attacks of ocular muscles, and lastly the involvement of the cranial nerves supplying ocular muscles as part of central nervous disease must all be carefully considered in deciding this question.

Neurasthenia with lowered nervous and muscular tone is shown by inability on the part of various muscle groups to overcome the normal prism degree. Insufficiency of convergence is particularly indicative of this trouble. Other symptoms of gout or rheumatism;

dull aching in the eyeballs; congested condition of the ocular and palpebral conjunctiva help one in arriving at definite conclusions as to the gouty or rheumatic origin.

A knowledge of general nervous disease is absolutely essential to the ophthalmic surgeon.

Local causes are best grouped, as Duane has done, into those resulting from overaction and those from underaction, hyper- and hypo-kinesis. In the first class we must place anatomic defects causing true concomitant hyperphoria and also spasmodic hyperphoria from efforts to compensate for a weak or paretic muscle. In the second class are defects varying from simple weakness to absolute paresis of a muscle.

In this connection I should like to emphasize the importance of carefully taking the field of fixation, which should show 35–38° upward and 50–55° downward rotation. Of equal import is the use of a red glass at 6 m. and a small fixation object-type or small dots, with which diplopia should be sought for in all parts of the field. An increase in the amount of separation in any definite direction leads of course to the belief that the muscle or muscles whose function it is to carry the eye in that direction are weak or paretic.

Treatment.—The therapeutic measures applicable to hyperphoria include local and general measures. Local: Corrective refractive prisms in position of rest; prismatic exercise; operative measures; tenotomy and advancement or muscle shortening. General treatment: Therapeutic measure indicated by the underlying cause. In many cases, painstaking, accurate measurement and correction of the refractive error results in disappearance of the hyperphoria; attention to refractive errors is always the first proceeding. Prisms in position of rest give the greatest relief to some cases, while in other instances only aggravate the discomfort of the patient. Probably the cases in which they give marked and lasting relief are those of long standing and practically stationary paresis of one or more of the vertical muscles. Temporary relief, often very prompt and astonishing, may be gained by hooking on a prism in front of the refractive correction. The relief to remote symptoms by the procedure (at times little short of wonderful) indicates that operative measures will prove equally gratifying in their results. In many cases the result can not be foretold and the practice of allowing patients to wear prisms temporarily, so made as to hook on top of the glass, is one which I can thoroughly commend.

Operative treatment is not applicable in hyperphoria of variable degree; in paretic cases where there is some central nervous disease or where the condition is recent and progressive. Cases of hyperphoria dependent upon a disease of the muscles, rheumatic or gouty occurring in patients well on toward 50 years of age, who have not possessed binocular vision for some years, are also unfavorable for operative procedures.

Tenotomy is perfectly satisfactory and often brilliant in results when the hyperphoria is of the concomitant variety and where it is constant in amount and character, where prism tests and fixation field and other methods show marked overaction of one of the vertical muscles.

Advancement should be preferred to tenotmy in cases of long standing and non-progressive paresis of a vertical muscle, and also where prism tests or fixation field show manifest weakness of the vertical muscles.

In hyperphoria of 1 to 2° and rarely of 0.5°, I have had unexpectedly brilliant results from both prismatic and operative treatment and we should always bear in mind the relatively great disturbance of 0.5° to 1° of hyperphoria when the total strength of the vertical muscles is represented by 2.5° to 3° prism.

My experience with prismatic exercises for the vertical muscles has shown that immediately after tenotomies, where the effect gained has been insufficient, a persistent and faithful course of prismatic exercises, carried on while the conditions of healing are as yet unsettled, results in marked benefit, which I have found to be permanent in its effect.

CONCLUSIONS.

1. It is essential at the outset that a distinction should be made between true and spurious hyperphoria.

2. It is absolutely imperative that before deciding upon any line of treatment for hyperphoria a careful and accurate examination of existing anatomic conditions should be made, which should include: Estimation of refraction, determination of tension of extra-ocular muscles as indicated by their ability to overcome diplopia produced by prisms properly placed; measurement of the field of fixation, monocular and binocular, and an employment of all the tests which tend to remove the strong impulse to binocular single vision and reveal latent defects such as the red glass, Maddox rod, etc.

3. Treatment should be directed against the underlying cause after determination whether the defect be due to spasm, paresis or actual overaction from anatomic conditions, tendon insertion, etc.

4. Tenotomy is indicated only in muscles showing too great power. Advancement or muscle shortening in cases revealing weakness of a muscle or at least no overwhelming power in its antagonist.

5. There is urgent need of a more satisfactory classification of the entire subject of motor abnormalities.

DISCUSSION ON PAPERS OF DRS. PRINCE AND CARPENTER.

Dr. EDWARD JACKSON of Philadelphia—I have not seen Dr. Prince's instrument until now, so I can not give results of any trial of it. I notice one thing in the mechanical execution, that is, the rods are made very perfectly. You can not take half rods for this purpose without getting a slight interval separating the parts of the streak that each rod gives. This has been made by taking a little less than one-half of each rod. The principles involved are not new, but the method of working them out is, and it seems a very simple and efficient instrument.

In noting down the results of such examinations, for several years I have employed certain signs that require less time to write them, less room in the case-book, and can be read more quickly and more unmistakably than other abbreviations indicating orthophoria or heterophoria of any kind. Some of them have been employed by others and some, I think, are new. They include the sign of libra (⎓) for lateral balance, and vertical parallel lines(‖) to indicate vertical balance. For exophoria the lines diverge from left to right thus <, and for esophoria they converge from left to right thus >. For right hyperphoria I take the two lines, which for vertical balance are both vertical, and simply place the right line sloping away from the other, thus V; in left hyperphoria, in the opposite direction ∧. These lines can be read very easily and you can record a half dozen observations, made at different times, on the same line of the case book.

As regards this instrument, the only thing I have to remark is on the extent of the scale, running up to 15 degrees. That is considerable less than rotary prisms have usually been made to give, but will answer all practical purposes. There are many persons with good rotation who do not get more than 15 degrees of adduction on the first trial. If one finds with this that there are 15 prism degrees of adduction, unless there be something pointing to weakness of adduction, this may be assumed in a routine examination to be enough. The weaker the prism, of

course, the more accurate its work for the lower degrees. Still I think this is not equal to the triple rotary prisms which I proposed, which give the long spaces instead of the short spaces between the low degrees. The Maddox rod, in some form, I rely upon chiefly for routine examination for heterophoria. I use it in all cases, and if there is reason to follow out that line of investigation further, I afterward resort to other tests of muscular balance.

Dr. H. M. STARKEY of Chicago—I used the new instrument of Dr. Prince for a short time, it having been sent to me for study, but not long enough to give any definite idea as to whether I should consider it more useful than other instruments we have. I made, in my mind, the same criticism that Dr. Jackson has spoken of, that it would be more easily used if arranged as Dr. Jackson's adduction prisms are. One point in exercising the adductors; if we use the prisms and find adduction of 10, 15 or 25 degrees, we can then place the duction indicator over that and rotate it to the same extent of 15 degrees and the image would still be kept single. If we put a prism of 20 degrees in front of the eyes for stimulating adduction and placing the Prince thorometer in front of that, rotate it until we add 15 degrees, we can not afterward go up to 15 degrees with the prisms; it did not stimulate the muscles except in just that way.

Dr. S. D. RISLEY of Philadelphia—I have been very much interested in this very ingenious instrument and will take an early opportunity to study it more carefully. This is the first I have seen of it in its latest form. I wish to speak particularly of Dr. Carpenter's paper, and to say that I am thoroughly in accord with the principles of classification and the methods of examinations to which he has so briefly but clearly referred. I was glad to see him separate those cases that may be due to general dyscrasia. I am sure these may be readily overlooked. There are many persons with rheumatic or gouty diatheses that have transient spells where the amount of variation in the ocular balance is very irregular. We have all seen transient palsy due to gouty disturbance, and before we enter upon operative procedures these cases should be excluded. One class of cases that were not mentioned is the group where abnormalties are simulated by disease at the macula. I have seen cases in which the eyes were drawn this way or that to get rid of an absolute scotoma. If the Maddox rod is used and you guide the patient a little, you will find a blurred spot in the line itself, or that a section of the rod is absolutely cut out by the blind spot of the macula. I presented a paper at Edinburgh in which I divided these into two classes, 1, those due to some anatomic defect in the muscle or its relation to the ball or to disease, leading to muscular anomalies, and 2, those due to errors of refraction. The last were relative and disappeared when the refractive error was corrected or with brief training of the muscles. The patient had to be taught to overcome the relation between convergence and accommodation.

In this group the correcting glasses make it necessary for him to learn a new order of things as regards the relation between accommodation and convergence, but when he has learned this the relative insufficiencies disappear. I am sure that heterophoria often exists in consequence of anatomic defects in the skull. We know perfectly well that the skull is distorted in a large number of persons. The first group, or the absolute insufficiencies frequently grow out of these abnormalities in the skull and shape of the orbit, which give rise to disturbances in the length of the muscles and their attachments to the eyeball, and in those cases we may correct the error of refraction, but the abnormality of balance will remain until we have adopted some form of operative interference. These I have called absolute insufficiency.

Dr. J. T. CARPENTER, Jr., of Philadelphia—There was one point in my paper in regard to prism exercise for the muscles, which I did not have time to read; that is the value of using the prism exercises after an operation that has not produced sufficient results, I mean immediately after the operation. The result of such exercise has in some cases done permanent good and increased the effect of an operation that was not sufficient; this is especially applicable when the hyperphoria is of low degree and yet a disturbing element. A point that we should not forget is that the entire strength of the vertical muscles is represented by 2 to 4 degrees and a defect of 0.5 degrees even is a serious burden for these muscles.

Dr. A. E. PRINCE of Springfield—I want to call attention to a point that has occurred to me in regard to discovering a small amount of hyperphoria that does not render itself apparent upon application of the rod test. It is by sursumduction; in this way, do not commence with the weak prisms and run up, but take a prism that will give you diplopia and then go to weaker ones. That gives the balance and you will find indications that will be quite useful. I will make it clear by a case which had been examined by different men and showed no hyperphoria. I found that if I used a prism that gave diplopia, one of 4 degrees, and then used a 3, 2.5 and 2 degrees prism, and then worked the other eye in the same way, that they come together, one at 2 degrees and one 2.5 degrees, so there was 0.5 degree difference. By putting that correction in the glasses the little patient was entirely relieved of all trouble.

AMBLYOPIA EX ANOPSIA, WITH CASE.

Presented to the Section on Ophthalmology, at the Forty-eighth Annual Meeting of the American Medical Association, held at Philadelphia, Pa., June 1–4, 1897.

BY A. C. SIMONTON, M.D.

SAN JOSE, CAL.

The only apology that need be offered for presuming to discuss the question of amblyopia ex anopsia before this learned section of the AMERICAN MEDICAL ASSOCIATION is to state the existing fact that in this year 1897 there are eminent ophthalmologists who deny the possibility of the occurrence of the said condition. It would seem that this question should have been definitely settled long since, but it was discussed extensively, *pro* and *con*, at the meeting of this ASSOCIATION in 1893, and at this meeting we are to have some more *pros* and *cons*, no doubt.

How any ophthalmologist who observes closely, thinks clearly and weighs well the terms he is using, will venture to assert that there is no such condition as amblyopia ex anopsia I shall not attempt to explain. While it is a fact that it has not fallen to the good fortune of many oculists to observe the restoration to perfect vision of an eye almost totally blind from disuse, yet many ophthalmologists have observed many cases in which there has been partial restoration of vision after a strabismic eye has been rendered parallel with its fellow. But the restoration not being complete they assert, by the careless line of reasoning and expression before mentioned, that inasmuch as there yet remains amblyopia, the strabismus was caused by original amblyopia and not amblyopia by the strabismus. But when it is acknowledged, as is the case by all authorities, that in a strabismic eye which is highly amblyopic a large percentage of vision may be acquired when the eye is rendered parallel with its fellow and the function of fixation established, is it not equivalent to acknowledging, at least, that the vision thus gained had been in abeyance by reason of lack of use? If so, does not that constitute amblyopia ex anopsia? If this eye, which gains much vision, had always been parallel with its fellow, does any one suppose for a moment that its visual power would ever have fallen below the full amount now gained by virtue of use in later life? Whether such eye had an original defect which would have rendered it more or less permanently amblyopic or not, it is clear that to the extent vision is restored by use, vision had been lost by virtue of non-use. If one-fourth, one-half or three-fourths of the visual power may be lost or never acquired in a strabismic eye by non-use, is it not logical to conclude that in many cases the total loss in visual power is attributable to this cause? If not logical then why not?

No doubt quite a percentage of eyes become strabismic because of opacities of the cornea, lens or other media, or defective retina, and we find the same class of individuals who deny the existence of amblyopia ex anopsia contend that all strabismic eyes become so by virtue of defect of vision in the converging or diverging eye, and not on account of any conditions relating to accommodation and convergence as

maintained by Donders. But all agree that there is frequently partial restoration of vision; therefore, there must have been partial amblyopia ex anopsia. And as said before, if part of an amblyopia may be due to want of use the total amblyopia may be thus caused.

The members of our profession who admit fully the existence of amblyopia ex anopsia are also those who agree with Donders that convergent strabismus in a very large majority of cases is due to hypermetropia. The question is raised by those who deny the existence of amblyopia ex anopsia that if convergent strabismus is caused by hypermetropia why do we not have a thousand cases for every one that now exists, since the number of hypermetropes is very great compared with the cases of strabismus? But why are there comparatively so few cases of strabismus when there are so many cases of hypermetropia, has been asked many times and long ago. All students of physiologic optics are familiar with the relations that exist in emmetropia between accommodation and convergence, that these relations are co-ordinate and reciprocal. Now while it is true that under exactly normal conditions there is precisely a given amount of convergence corresponding with a given amount of accommodation, yet these conditions are frequently in abeyance for one reason or another; therefore there is another fortunate possibility on the part of human eyes provided for, and that is the power of *dissociating* the two functions of convergence and accommodation. All know how this must be done in adult life in the use of optic instruments, and in presbyopia when spectacles are used. But in adult life, after the individual has long enjoyed perfect binocular vision, there has supervened a greater adaptability to varied visual conditions than possibly existed at a time when binocular vision at the near point was being established in infancy.

In a certain percentage of children this power of disassociating the two functions of convergence and accommodation is nil; in other words, they have no relative range of accommodation and convergence. In an infant who can not disassociate these functions and in whom hypermetropia exists there must inevitably follow convergent strabismus, since accommodation and convergence must be equal. This to my mind is the exact reason why a certain per cent. of hypermetropes become strabismic when accurate binocular vision at close range is being established, and this without the existence of any defect of vision on the part of the converging eye. And again, this theory will explain why it is not necessarily in high degrees of hypermetropia, rather than how, that strabismus occurs.

It is not nearly so difficult to ignore, mentally, an indistinct image in an eye out of parallel with its fellow, as many are given to suppose. Quite occasionally in our tests of muscle equilibrium we find that our patient, although possessed of good binocular vision, can with difficulty recognize the second image produced by the use of prisms.

But when the focal point in a strabismic eye falls upon the disk, as it often does in convergent strabismus, there will be no nervous impression to ignore. It is in these cases of convergent strabismus where the focal point falls on the blind spot that we have early amblyopia, and if conditions are allowed to continue almost total loss of vision in a few years. It is different in divergent strabismus. In this case the focal point falls on sensitive retinæ outside the macula. It has been my observation that in outward deviation the amblyopia is not nearly so great, as a rule, as in the convergent form. In many cases a large amount of vision remains in a divergent eye and yet the person is not troubled with double vision in the least. Close the habitually fixed eye and fair vision will be manifest in the diverging eye. Some of these patients, no doubt, use their eyes alternately, as is the case with many of the lower animals whose eyes are so placed as to preclude binocular fixation. It seems that these animals have the power of acute vision with either eye while ignoring the image in the fellow eye for the time. At all events it remains a fact that in divergent strabismus, in many cases, quite a percentage of vision remains in the divergent eye with no recognized diplopia. But on account of the fact that the focal point does fall upon sensitive retina, although said impression is not recognized in the sensorium, it results in preserving to a greater extent the function of the nervous apparatus of the eye than would be the case did the focal point fall upon the blind spot.

So few have been the cases reported of complete restoration of vision of an eye that has been strabismic and amblyopic that the profession is almost incredulous in regard to such reports. Learned ophthalmologists were surprised by the report of a case by Dr. Johnson at the Milwaukee meeting of this ASSOCIATION in 1893, in which case there was complete restoration of vision in an eye that had been strabismic and amblyopic from early iafancy, to the extent that vision was almost *nil*. Some of these able confrères remarked that it was the first and only case that had come to their notice seeming to establish the doctrine of amblyopia ex anopsia, forgetting, as I have stated before, that partial restoration of vision of an amblyopic eye is as much evidence of amblyopia ex anopsia as full restoration.

In concluding this paper I will report a case, in my own practice, in which a highly strabismic and amblyopic eye was restored to perfect vision by correcting hypermetropia alone.

Case.—March 31, 1892, Pauline C., aged 8 years, was brought to my office for consultation about strabismus of the left eye, which had existed from the age of three years. The convergence was in high degree. Owing to the fact that fixation of the left eye had practically always been in abeyance, it was somewhat difficult to assume this function with the right eye covered. Our first test of vision elicited the information that the patient could recognize her father at about five feet, and recognized a pencil held in the hand at four feet, but could not tell how many fingers were held before her at this distance. I attributed this low state of vision on this occasion to inability to fix the left eye. Vision of right eye was $^{16}/_{60}$, and with — spherical 1 D. she read in part $^{16}/_{20}$. Plus glasses obscured vision more. Owing to meager vision manifested by the left eye at short range I did not test acuity of vision at distant letters. I put the eyes under the influence of duboisia for further and better examination. R. V. $^{8}/_{200}$. With + S. 2 D. read $^{16}/_{20}$. Here was positive evidence that ciliary spasm had existed in this case making an apparent myopia in a case of hypermetropia. Under duboisia and with + S. 2 D. the left eye now read indistinctly, $^{16}/_{60}$. This was the best vision that could be obtained with lenses. Skiascopy confirmed the existence of 2 dioptrics of hypermetropia.

I placed + 2.50 S. before these eyes and sent the child home, the eyes being fully under the influence of duboisia. I hoped on account of the vision remaining in the left eye to be able to overcome the strabismus and acquired amblyopia by glasses alone. The sequel proves that my hope was well founded. It will be observed that I gave over-correction. The

patient called at my office April 4, 1892, when I discovered the eyes were about parallel. On April 9 strabismus had disappeared. At this time, with + S. 2 D., read $\frac{16}{40}$ with left, showing quite an improvement. I directed that the right eye be covered for two hours each day for distant vision. July 13, three and a half months after adjusting glasses, distant vision of left was $\frac{16}{16}$, and medium print at fourteen inches. I have seen this patient often since the last date and vision is perfect. I have continued, from the first, the use of 2.50 D. lenses, both for distance and near. They blurr distant vision slightly, but are no detriment at the near point. My reason for continuing the strong glasses is that the tendency to squint has never disappeared and the instant the glasses are raised from the eyes the left one again converges.

While this was not a case of the most extreme amblyopia, yet it was amblyopia in quite high degree, and it demonstrates most clearly that the strabismus was not due to original amblyopia, for there is none finally left. It demonstrates, also, as clearly as though the case were an extreme one, that the entire amblyopia was due to the strabismus, and if the strabismus had continued a few years longer vision would have been almost totally lost in the left eye. There is nothing clearer to my mind than that this conclusion is correct, and there is such a condition as amblyopia ex anopsia.

AMBLYOPIA FROM SUPPRESSION, CONGENITAL IMPERFECTION OR DISUSE: WHICH OR ALL?

Presented to the Section on Ophthalmology, at the Forty-eighth Annual Meeting of the American Medical Association, at Philadelphia, Pa., June 1-4, 1897.

BY LEARTUS CONNOR, A.M., M.D.
DETROIT, MICH.

Since different writers use the term "amblyopia ex anopsia" to express radically diverse ideas, it is needful to define its meaning in this discussion. Negatively it is not applied to a dulness of vision induced either by an organic lesion, which can be objectively seen with the ophthalmoscope or otherwise; nor by exclusion of light from the retina, in part or whole, during long periods; nor by defective refraction or disturbed muscular equilibrium of either ciliary, rectus or oblique muscles. Positively it is applied to that dulness of vision which attends the inability of the brain to recognize impressions sent it from the retina.

As to the nature and causes of the dulled vision, we have three widely differing views. The first contends that the brain actively inhibits the visual center from receiving impressions, until it loses its receptive power in whole or part; the second says that the brain or visual center was not properly constructed; while the third argues that the phenomena result from simple disuse, like the disability induced in other organs by a cessation of much or all of their functional activity during a considerable period. The relative importance of these views is of a practical nature. If we adopt congenital imperfection, it matters little whether cases of squint with amblyopia are operated upon early or late; whether the refractive defects be corrected at once or at convenience; the visual results will be the same. If suppression be accepted, then it were criminal to delay in the rectification of those causes which are believed to induce the loss of sight, lest the inhibitory power of the brain continue to the production of absolute blindness. If the amblyopia be regarded as due to simple disuse, then surely every consideration prompts to an immediate restoration of the fullest functional activity.

Ophthalmologic literature affords abundant authority in support of either of these views, and of the practice based thereupon. In this state of the question, discussion by experts is of more than passing moment, and to secure such discussion from this Section is the object of this paper.

The suppression view of amblyopia claims that the brain, being disturbed by conflicting images sent it from separate eyes, inhibits the visual center from recognizing the least perfect one. Frequent repetition of this inhibition, at last, so changes the cell action of the visual centers that they become unable to recognize the imperfect image. These imperfect images are due to a variety of causes, as refracting errors, muscular derangements individually or combined in all sorts of ways. On the suppression view there could be no amblyopia except for imperfect images sent to the visual center and so none without lack of muscular equilibrium, or refractive errors alone or variously combined.

The congenital imperfection view of amblyopia affirms that the visual centers were never normally developed or, if developed, were damaged anterior to birth; it is uncertain whether the defect be in the brain outside or within the visual centers, in the retina or optic nerve fibers. The central scotomas of many cases suggest a pathologic anatomy like that of the toxic amblyopias; they are sometimes for form alone and sometimes for both color and form.

A presumption against the suppression view arises from the fact that in no other instance is it claimed that the brain, by inhibition. actually destroys the functional activity of any organ beyond possibility of restoration. We have many illustrations of imperfectly formed organs, as clubfoot, harelip, colobomas of the iris, retina or choroid, but we know of no organ born with normal development, rendered imperfect by the capricious dislike of the cerebrum.

To determine what light, if any, clinical evidence would throw upon this subject, I studied 7,500 recorded cases of imperfect vision, all from private practice. The standard of amblyopia adopted was an inability to see 20/40 or more after correcting all defective refraction, under full mydriasis, removing all muscular disabilities and securing a normal condition of the general health. Of these above 4,000 were anisometropic, but only sixty were amblyopic; showing that amblyopia was a very infrequent attendant of anisometropia, and so unlikely to be caused by it. Anisometropia was found a frequent condition in all cases of convergent squint, but of the fifty-four amblyopic squint cases, only twenty-two were anisometropic. As there was more than three times as many cases of non-amblyopic as of amblyopic squint, it is plain that anisometropia was an unimportant factor in causing amblyopia in the squint cases. Thus my own observations give no reason to believe that anisometropia is a factor in causing amblyopia. According to the suppression view squint is regarded as an important factor in producing amblyopia, while according to the imperfection view, the amblyopia aids in causing squint.

My records do not exhibit a single instance of ambly-

opia among cases of vertical squint; though on the suppression view we should have expected a proportion similar to their frequency in other varieties of squint, because there must have been at the beginning an equal degree of confusion among the images sent the brain. Of 219 cases of convergent squint only fifty-four were amblyopic, a small proportion if squint was an active cause of amblyopia. Of fifty-four amblyopes that squinted only twenty-two were anisometropic; so that neither the squint or the squint combined with anisometropia were important factors in producing these cases of amblyopia. Of 127 cases of amblyopia, only fifty-four ever squinted. It thus appears that the majority of cases of convergent squint are not amblyopic, and the majority of amblyopes do not squint; evidence weighing strongly against squint as a cause of amblyopia.

Donders showed that hyperopia accompanied most cases of convergent squint, but farther studies prove the problem far less simple than he thought. Thus, since the normal condition of all eyes at birth is hyperopic, why does not squint occur more frequently? The suppression view says that hyperopia causes confused images, which induce the brain to inhibit the visual centers and thus cause amblyopia. In truth, only few hyperopes squint, and very few are amblyopic. The facts militate against the suppression view here also. Incidentally the facts seem to show that lack of muscular equilibrium rather than either hyperopia or imperfection of the visual centers, is the essential factor in causing squint. In common with others, notably Dr. Valk, I have found that the normal power of the internal rectus to that of the external is as four to one. If this be changed, we have convergent or divergent squint according to the refractive defect; if it remain unchanged there is no squint. On the assumption that squint caused amblyopia, we should expect that the cure of squint by operation, or the correction of existing refractive defects or exercise, or a combination of all, would improve vision, but I am unable to find a single case with central scotoma in which the vision was materially improved. Other cases were improved in the ability to use the eyes for longer periods, but their actual visual acuity was unaltered. On the suppression view we ought to find cases in which the squint or anisometropia remaining uncorrected, the sight became progressively worse to such a degree that even the patient would note the loss; but I have failed to find such cases.

Then, if all eyes were born with normal vision, some observer ought to have noted good vision in an eye which afterward became amblyopic, and thus demonstrated the fact of suppression. I am aware of the difficulty attending such studies, but it has happened to me to occasionally meet with a child so tractable as to admit of a satisfactory determination of its vision and refraction by objective and subjective methods, and I have failed to observe any loss of visual power without a cause recognizable with the ophthalmoscope. Nor have I found any reports of such observations. Hence, we have no direct proof of the suppression of good vision as a cause of amblyopia.

We do find cases of children born with monocular amblyopia. Twenty such I found in my own records, and Schweigger reported ninety-eight having varied defects of refraction. They could not have been caused either by squint, anisometropia or dissue, and so must be from congenital defect.

It is claimed that cases of scotoma like those found in squinting eyes are unknown; but my records show twenty cases who never squinted, and yet exhibited a central scotoma of more or less density. Possibly these might be found more frequently, were they carefully looked for. It is reasonable to ascribe these similar scotomas in both squinting and non-squinting eyes to the same cause. That of suppression being untenable, congenital defect must be accepted. As diplopia from ocular paralysis, even in the very young, is a source of distress, we should expect to find some indication of such distress antedate the development of amblyopia, but I have no indication of such distress, though I have often looked for it. Monocular amblyopia, with central scotoma, without squint or anisometropia, would seem to form a combination impossible to account for on any other view than congenital defect. I found four such cases, aged 6, 13, 19 and 45 years. As far as the most searching investigation could determine, there had never been any squint, the scotoma had existed at birth, and there was no anisometropia.

Case 1.—Ava P. Bancroft of Michigan, aged 6 years, brought to me Sept. 4, 1891, by her physician, Dr. Harvey, on account of defective sight. Vision of right eye, $^{20}/_{200}$; left eye $^{4}/_{200}$. A total hyperopia of plus D. 2.50 S. was found in each eye, by the ophthalmoscope and retinoscope, and subjectively confirmed by test objects. The examination was made before mydriasis, under mydriasis and after it had passed off. The correction of the total hyperopia gave the right eye vision $^{20}/_{50}$; the left $^{20}/_{100}$. In the left eye the vision was best at the left of the median line both for color and form. Dr. Harvey had noticed the defective vision three years previous, and no change had been observed by either the doctor or the parents. A re-study of the case two years later showed the vision and scotoma unchanged.

Case 2.—Miss M. A., Toledo, Ohio, aged 19 years, was seen March 13, 1887, on account of intense headaches. Vision of right eye, $^{20}/_{40}$; left eye fingers at six inches and only at the borders of the visual field with any distinctness. Under mydriasis vision of the right eye $= {}^{20}/_{20}$ with plus D. 2.25 S. ⌒ + D. 0.50 C. ax. 60. Determined objectively by ophthalmoscope and retinoscope the refraction of the left eye was the same as the right, but its vision was not materially increased by its correction. Two years later, patient reported entire relief from headaches while wearing full correction of the defective refraction, but there was no change in vision. Her father, a careful physician, said that he had observed the defective vision pefore any attempts of the child to read letters, but had never noticed any squint.

Case 3.—Miss A. H., Windsor, Ontario, aged 13 years, on June 14, 1881, consulted me for dimness of vision in her right eye. Vision of right eye, $^{2}/_{200}$; left eye $^{20}/_{50}$. Under mydriasis she was found to have a hypermetropia of two dioptrics in each eye. The correction of this increased the vision of the right eye to $^{6}/_{200}$; left eye $^{20}/_{20}$, Jaeger No. 1. The right eye had a large scotoma for both form and color. Five years later the condition was practically the same. No history of squint could be obtained from either patient, friends or family physician.

Case 4.—Miss F. H. H., aged 45 years, consulted me June 10, 1890, for a dimness of vision. Her uncle, an accomplished physician, in whose family she had been born and reared, said that before she was two years old the defect in her left eye was noticeable, and had remained unchanged, but he had never observed any squint.

V. O. D. $= {}^{20}/_{40}$, $^{20}/_{30}$ w. — D. 1.00 C. ax. 90° ⌒ + D. 0.75 S.; J. 1, w. + D. 2.25 S.

O. S. $= {}^{20}/_{200}$ w. — D. 1.00 C. ax. 90° ⌒ + D. 0.75 S. J. 13, w. + D. 2.25 S.

In this case the amblyopia was observed long before any attempts to read, there was an absence of anisometropia and any tendency to squint. There was a central scotoma of the left eye like that found in cases of squint.

In each of these cases, as there was complete absence of all the causes of suppression of defective images, the amblyopia must have been from congenital defect.

The data thus far presented show that the existence of amblyopia from suppression is at least doubtful, while that from congenital defect is certain.

There is another class of cases, often confounded with true amblyopia, and so causing much confusion in both thinking and practice. Hence it is necessary to consider it in this connection. Their vision is more or less diminished, there is no scotoma, and they improve under appropriate management. This impaired vision is from disuse more or less complete from a variety of causes, as refractive defects, lack of muscular balance, from constitutional disease, overwork, etc. Any disuse of the eye operates unfavorably upon visual acuity by impairing the power of fixation, by giving imperfect control of accommodation and by rendering the retina easily fatigued. In these cases sight is often improved and occasionally entirely restored by removing the occasion of the disease. Illustrative of this is the following case; that the subject was approaching middle life shows that improvement of these cases is not confined to childhood.

Mr. G. W., a lawyer, aged 36 years, on Aug. 22, 1885, consulted me for poor sight in his left eye. The ophthalmoscope revealed no organic change in either eye. Vision of right eye was $^{20}/_{40}$; left $^{20}/_{100}$. J. N. 4 with right eye, No. 10 with left eye. Under mydriatic, the right eye gave vision $^{20}/_{30}$ with + D. 1.25 C. ax. 180° ⌒ D. 1.00 S.; the left eye $^{20}/_{70}$ with plus D. 1.50 C. ax. 180° ⌒ + D. 3.50 S. On recovering from the mydriatic, with correcting glasses he could read J. No. 1 with right eye and J. No. 4 with left. He was directed to wear the glasses constantly, soak his eyes in hot water ten minutes after concluding work daily. Five months later vision of right eye was $^{20}/_{20}$; left $^{20}/_{50}$. Since, at intervals, his glasses have been changed to meet advancing presbyopia, until Dec. 26, 1896, with glasses, vision of each eye was $^{20}/_{20}$ and J. No. 1.

Not all cases give as favorable results, owing doubtless to lack of faithfulness on the part of the patient, or often from complicating actual defect in the visual apparatus less than occurs in amblyopia, though of the same nature.

In children these cases are often benefited by compulsory use of the bad eye, and of a magnifying glass for near objects, by turning them out of doors as much as atmospheric conditions will permit, and otherwise adjusting their lives so as to develop the greatest physical vigor.

Cases are reported of the speedy cure of the amblyopia of a squinting eye after the destruction of its fellow. Thus, Dr. Walter B. Johnson (*Amer. Oph. Jour.*, January, 1894) reports two cases. In both the good eye was destroyed by accident. In one the squinting eye sufficed to count fingers, but normal vision was established ten days after the accident. The second case was a man 30 years of age, with a history of convergent squint from childhood. At 16 he discovered that he was unable to read as well with the right eye as with the left, and no glass which he could select at the optician's greatly improved his sight. At 17 he was operated on at the New York Eye and Ear Infirmary. On Aug. 28, 1893, while working at his trade, his left eye was so injured by a piece of iron as to reduce vision to the counting of fingers at six inches. The vision of his right eye as tested by Dr. Johnson just after the accident was $\frac{20}{70}$, not improved by glasses. Four days later the vision of the right eye was $\frac{20}{20}$, with or without a plus 1.24 S. Three months later he could merely count fingers with the injured eye at six inches; with the right eye vision was $\frac{20}{20}$, or with plus 1.24 $\frac{20}{10}$.

I have one case of the same nature in which the result was less satisfactory.

E. B., aged 28 years, a laborer in the Penin. Car Works, was brought to me for an injury to his right eye on Nov. 26, 1890. He and his friends said that the left eye always converged, and that he never could see anything with it. The accident had torn the eyelids, smashed through the eyeball, tearing the ciliary body, the lens and sclerotic in such a manner as to practically destroy all sight. Because of the blind left eye every effort was made to save some sight in the right eye, but to no purpose. An examination of the squinting eye, at the time of the accident and many times thereafter, failed to detect any disease of either optic nerve or any of the media, choroid or retina. There was mere perception of light at the periphery of the visual field. This perception did not increase to any appreciable degree, nor has it done so when last seen, three years after the accident.

The explanation of these cases is that one is from congenital defect and the other from disuse. The amblyopia from disuse develops its latent power when the necessity for the same presents; the other having no latent power because of congenital defect, and so remains blind, even after destruction of its fellow eye. In my case, there was certainly a central scotoma, and the history of Dr. Johnson's cases would seem to make evident the fact of a normal field of vision, as no mention is made of a scotoma.

Conclusions. — 1. There are undoubted cases of amblyopia from congenital imperfection; characterized by central scotoma, and being unaffected by any treatment; they are found in eyes that squint and eyes that do not squint, in the hyperopic, astigmatic, the anisometropic and in eyes free from one or more of these defects.

2. There is no positive evidence of the existence of amblyopia from suppression, viz., a loss of sight from the inhibitory action of the brain upon the visual center.

3. There is a class of cases often confounded with amblyopia, characterized by lack of persistent vision, rather than absolute loss; by the absence of scotoma; improved often by proper management, is never congenital; found in all varieties of refraction and all sorts of muscular disturbance; having the same nature as diminished functional power of any sound organ from non-use or diminished use.

4. There is a class of cases in which a congenital amblyopia is still farther crippled by disuse; in these proper management often produces satisfactory results in removing the latter factor.

5. It therefore remains good practice to study every case of amblyopia with or without squint at the earliest possible moment, correct its refractive defects and restore its muscular equilibrium, because, while we can not repair the congenital imperfection, we may remove the disability from disuse and thus secure some improvement of vision.

103 Cass Street.

DISCUSSION.

Dr. H. M. STARKEY of Chicago in opening the discussion said: The author of the paper has covered the ground so completely from a theoretic standpoint that little remains to be said in that direction. The definition he proposes is new to me and gives quite a different conception of this term from that previously held by me and from that usually held, if one may judge from that given in most text-books. I did not suppose that amblyopia ex anopsia is usually applied solely to cases in which there is inability of the brain to perceive images impressed upon the retina. We have found, as Dr. Connor has, that much confusion arises from considering several different conditions under the same name, but if we restrict the term amblyopia ex anopsia to those cases in which the brain refuses to receive images, we are under the necessity of coining another term for the cases that have usually been so called, while we are not at all

certain that we have any cases to which the term may be rightfully applied. As the author has well stated, we have little or no evidence that amblyopia is ever due to suppression, by the brain, of an impression that has been properly conveyed to it. But if the generally accepted meaning is given to this term, namely, that through non-use of the eye the faculty of vision is lessened or lost, we must, unless we ignore facts, admit that such a condition exists. We most of us, I am sure, see cases of defective vision in one or both eyes, in which after careful stimulation of the sight under favorable conditions, the vision improves. There are two classes of these improvable cases. The first class includes young persons having a high degree of ametropia and who, consequently, have never seen clearly. Many such young people, after careful correction of the ametropia, will have vision only one-fourth or one-half normal, but after they have worn the correcting glasses for a few months, vision improves so that they see 50 or 100 per cent. better with the same glass than they did when the glass was first prescribed.

The second class contains persons having strabismus with habitual disuse of one eye. We all recognize that there are many strabismus cases in which there are central scotomata and which are doubtless congenital, in which an improvement of vision is possible; but on the other hand, there are many strabismics in whom a very decided improvement in the vision of the deviating eye can be brought about by systematic and persistent use of that eye. So frequent is this improvement, that it is my custom in treatment of strabismus to first correct any refractive error present and then direct systematic use of the deviating eye, deferring the operation till a later time. And in a considerable proportion of cases, I expect and secure very decided improvement both in the position and in the acuity of vision of the deviating eye. Whether we call the condition present in these cases amblyopia ex anopsia, or by some other term, is beside the question. The condition is present and can be improved. I repeat this statement because I have lately heard a prominent teacher in a neighboring city make the statement to his class, that the amblyopia found in the deviating eye in strabismus is never due to disuse and is never materially improved by operation or by any other means. I will give a brief outline of a few recent private cases illustrating the points I have tried to make. I have the original records of the cases, so that any of the members of the Section who desire to do so may examine them.

Case 1.—Gertrude P., schoolgirl aged 15, referred to me July 17, 1896, by Dr. C. S. Bacon. Vision right eye $^{20}/_{20}$ — not improved by any lens; vision left eye $^{20}/_{200}$ with 4. D. C. axis 170° $^{20}/_{30}$ —. The vision of the left eye has gradually improved until at the last examination, a few days before I came away, she saw with the same lens the 20 line better than she at first saw the 30 line.

Case 2.—Lottie S., schoolgirl, aged 13 years, referred to me Feb. 3, 1897, by Dr. F. C. Schaefer. Vision right eye $^{20}/_{200}$ with — 3.50 D. S. ⌒ — 7. D. C. axis 10° $^{20}/_{70}$; left eye $^{20}/_{400}$ with — 1.00 D. S. ⌒ — 7 D. C. axis 180° $^{20}/_{50}$ —. With these lenses, February 24, vision was $^{20}/_{60}$, and $^{20}/_{40}$, and May 17 it was $^{20}/_{40}$ and $^{20}/_{30}$ except that one letter was missed in each line.

Case 3 is the most marked case of improvement in a deviating eye that has come under my observation, though numerous others could be cited with marked improvement. Gertrude R., schoolgirl, aged 9 years, was referred to me for convergent strabismus, by Dr. John H. Hollister, July 19, 1894. The vision at that time in the deviating eye was $^{10}/_{200}$, and with careful correction under atropia, $^{20}/_{200}$. Under proper use of the eye vision steadily improved, being in August, 1894, $^{20}/_{70}$, in October, 1894, $^{20}/_{50}$, in December, 1894, $^{20}/_{40}$, in July, 1895, $^{20}/_{30}$ —, in May, 1896, $^{20}/_{30}$ +, and in October, 1896, $^{20}/_{20}$, and she now sees with this same eye most of the letters in the 15 line at twenty feet.

Dr. D. W. STEVENSON of Richmond, Ind.—I quite agree with Dr. Starkey that the definitions in the text-books no not quite agree with that of Dr. Connor. Amblyopia may exist with three conditions: 1. When there is no central fixation; 2, where there is, and 3, where there is lack of use. A person may have fairly good vision and yet not have central fixation. And here I would urge in examining children with muscle trouble, even if only 2 or 3 years of age, that it is important to treat them as thoroughly and carefully as older people, for if we can only guide that child to central fixation, it may prevent disfigurement in later life. Central fixation can only be learned in childhood. You can not expect a child whose vision has been blurred to learn central fixation in after years, for it can probably only be learned in the first few years of life. We note the difference in operating upon congenital and senile cataracts; in the latter though it may have lasted forty years, if he learned central fixation in youth he will still be able to fix. The important point we ought to learn is to look after these patients year by year until we operate upon them, and we ought to take every means to force them to learn central fixation.

Dr. C. H. THOMAS of Philadelphia—I remember the case of a child 4 years of age, who was able to be tested by test-types almost as well as an adult. He had strabismus on alternate days. It was on this account that I tested his refraction under mydriasis and found him practically emmetropic, full $^{20}/_{20}$ in each eye. After a year or more the strabismus settled down to a strong convergence of the left eye. This continued a year or so when I discovered that he was losing his vision in the left eye, it had fallen to $^{20}/_{50}$. I then operated and the relief obtained was considerable from the complete section of one internus, but there was something like 8 degrees remaining uncorrected. I performed a partial tenotomy of the fellow eye and obtained perfect balance. Within a year the vision was restored in the amblyopic eye and remains perfect to this day. He is now a grown man and I have examined the eye within the last few days; his vision is full $^{20}/_{20}$ in either eye. I had him under careful observation in the stage of perfect vision, in the stage of developing amblyopia and in the stage of perfect recovery.

Dr. J. L. THOMPSON of Indianapolis—While you may operate upon a man for cataract, and he will have just as good vision in one eye in which cataract has existed for a long time as in the one of shorter duration, I take it that nature seems to abhor a deviation as she does a vacuum.

Dr. WALTER B. JOHNSON of Paterson, N. J.—I have been interested in this subject for a long time. None of us would want to make the statement that there is no such thing as congenital amblyopia and not many of us would, in the light of occurrences, be willing to say there is no such thing as amblyopia ex anopsia. I think the suggestion that Dr. Connor made in regard to cases in which amblyopia, apparently from suppression, had developed, has been substantiated in many instances. I reported a case two years ago, at the American Ophthalmological Society, of a girl of 12 who came to me first with diplopia and in the course of a short while passed from observation. The diplopia having passed she was comfortable, and in the course of a number of years I saw her again. Her vision at first had been perfect, but in the eye which is now squinting it is only $^{20}/_{70}$. Now from the other side of the question, coming from lost to improved vision, I have reported two cases, one to the American Ophthalmological and one to the Ophthalmic Section of the Academy of Medicine. In both cases the good eye was lost, one requiring enucleation and the other by traumatic cataract. In each case the vision, in what had been the poor eye, returned to normal within three weeks. I know that in these cases we did not see anything with the ophthalmoscope, and, as Dr. Thompson has said, we can not yet view the cerebral apparatus.

Dr. G. C. SAVAGE of Nashville—Nature in my judgment has two methods of preventing diplopia; one the deviation of the visual axis and the other the suppression of the object mentally. In the lower forms of heterophoria and in orthophoria the method adopted is to cause the visual lines to cross, but in the higher degrees of heterophoria the other method is the one chosen, and it is applicable only in the earlier years of life. Every one of us knows that a squint developed late in life is always attended by double vision. It is too late for the mind to bring about the process of suppression and the patient must get on with double vision unless he covers one eye. The author of the paper has stated that there are cases of amblyopia in which there is no perceptible squint. We have other muscles than the recti.

I want to place myself on record in regard to one point about squint, that is, that when we have a squint that has existed from early life and yet vision as good in one eye as in the other, we are tampering with a case that will confuse us as we go further with it and which is almost impossible of correction.

Dr. G. E. DE SCHWEINITZ of Philadelphia—It was with much interest that I heard Dr. Connor's classification and investigation of the scotomas present in these cases. I have made a similar study. You find cases of squint, with amblyopia, in which the ophthalmoscopic picture, the visual field, etc., are perfectly normal; the vision can be improved with exercise; in others in which there is a distinct scotoma, neither exercise or anything else improves the vision. In a third class in which there is not an entirely normal ophthalmoscopic appearance, inasmuch as there are some changes about the macula, and the visual fields are similar to those produced by retinal tire the visual acuity is capable of a certain amount of improvement.

Dr. LEARTUS CONNOR—You see from the discussion how necessary it was to define what we meant. The amblyopia to which I referred, you will remember, I characterized as being always attended with central scotoma. The cases reported here were not so attended. Now, to confound such cases, that

are due to defects of refraction or lack of muscular balance, is simply confusing conditions, and I think it very important to use the same measure in all our work in these cases. I started out, too, with the idea that the ordinary definition was the correct one, but I found it used very differently by those who believe in the suppression theory. I correct, under mydriasis, and attain all the improvement I can, correct all the muscular equilibrium and then if there is loss of vision I report it as amblyopia. Such cases are absolutely incapable of benefit. They may be attended by the results of disuse as in other organs.

REPORT OF EYE EXAMINATIONS IN THE MINNEAPOLIS PUBLIC SCHOOLS.

TOGETHER WITH REPORTS OF THE EXAMINATIONS OF THE MOTORMEN OF THE TWIN CITY RAPID TRANSIT COMPANY, AND THE LOCOMOTIVE ENGINEERS OF THE MINNEAPOLIS, ST. PAUL AND SAULT SAINTE MARIE RAILROAD.

Presented to the Section on Ophthalmology at the Forty-eighth Annual Meeting of the American Medical Association, held at Philadelphia, Pa., June 1-4, 1897.

BY FRANK ALLPORT, M.D.

CHICAGO, ILL. (FORMERLY OF MINNEAPOLIS).

While it is true that a large proportion of school children possess inadequate distant vision, or irksome close vision, or but little vision at all, and are thereby unequally provided with a most important sense, which places them at a decided disadvantage in the world's arena, with its struggling, pushing applicants for place and power, and while it is of the utmost importance that such deficiencies be overcome by the application of modern ophthalmologic therapeusis, yet the search by our profession for an efficient and practical remedy for the general detection and relief of such infirmities, has not been crowned with success.

Undoubtedly ideal results could be obtained in detecting and relieving ocular defects in school children, through their systematic and personal examination by properly qualified oculists appointed for such work by boards of education, as was accomplished in Philadelphia some years ago by Risley, Randall and others. But the "City of Brotherly Love" is happily possessed of a singularly united and harmonious profession, with an inherent *esprit du corps*, rendering possible many professional movements practically unfeasible elsewhere, under circumstances of professional jealousy and strife. The writer feels therefore that the Philadelphia plan, while most desirable, is not generally possible, and that another method, simple, inexpensive and reasonably accurate in character, possible of manipulation by the laity, applicable to all cities, of a non-compulsory nature, giving free liberty as to choice of consultant and rendering impossible personal contact between a board appointee and the school children, except as they come as private or dispensary patients, should be devised and endorsed by ophthalmologists.

With this end in view the writer, Feb. 6, 1895, presented a paper to the Minnesota Academy of Medicine, which was published in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, March 2, 1895, embodying a plan for the systematic examination of school children's eyes by school principals. This plan was received favorably by the Academy and a formal request was forwarded to the Minneapolis Board of Education, requesting its adoption, but owing to reasons probably satisfactory to itself, the Board practically tabled the request until the election of the new Board in January, 1897, when it was promptly adopted and the writer appointed as Board oculist. But in the interim the writer has been given an opportunity of teaching the method at the University Summer School, and before the senior class in the department of pedagogy in the Minnesota State University, with the result of seeing it quite generally and favorably received in the University and many adjacent cities.

Drs. Harlan and Wood of Baltimore have used a similar plan, during the past two years, in the public schools of that city, and reported flattering results at the last meeting of this Section in Atlanta.

The expense in Minneapolis has not equaled $100, a little printed matter being the only requisite, as no salary is involved. The plan, though necessitating some extra labor, has been easily carried into practice, and the principals and teachers are its warmest advocates, feeling as they do, that it is a beneficent movement and will eventually lighten their labors, as the children are placed in better conditions for work and application.

The preliminary eye tests are to be made annually as near the commencement of the fall term as possible, in order to give ample opportunity for the observation of results. The examination should not be conducted in the presence of other scholars, as familiarity with the letters leads to incorrect responses. Children already wearing glasses should be tested with such glasses on the face, as this tends to mitigate any possible opposition from parents and attendant oculists, on the ground of meddlesome interference. It has been found useless, laborious and impracticable to examine first grade children, consequently they may be excluded from the tests.

One of the chief obstacles to success in the Minneapolis tests has been the consulting of opticians instead of oculists, through the fulsome circulars and advertisements of the former which were thrown broadcast as soon as the tests began; and the prevalent impression that this has been merely a test for glasses, and not for the development of ocular diseases in general. This fact leads me to urge principals and teachers to explain and emphasize these matters preliminary to the tests, and from time to time during the year.

The plan is briefly as follows: A superintending oculist shall be appointed by the Board of Education, whose duties shall be to superintend the details of the plan. He shall each year, at the beginning of the fall term, deliver a lecture to the principals upon practical ocular anatomy, physiology, refraction and its errors, the general use of the eye, etc., and shall demonstrate the plan upon from twenty-five to fifty pupils furnished for the occasion. He shall afterward be accessible to the principals for advice and counsel, and shall finally receive the principals' reports and systematically submit them to the Board, together with deductions, recommendations, etc. It will be observed that in an office of this kind there will be but little opportunity for adverse manifestations of professional jealousy, or accusations of unjust pressure upon children from business motives.

It should be first ascertained if the child habitually suffers from red or inflamed eyes or lids, after which the visual tests should be conducted. Snellen's test card should be used for the purpose of uniformity, and the vision of each eye recorded in the proper line of the statistic blank, as 20, 30, 40, 200, 0, etc., instead of 20-20, 20-30, 20-40, 20-200, 20-0, etc., being more intelligible to the laity, bearing in mind that only

defectives need tabulation. The child should be given credit for the smallest line of which he sees a *majority* of the letters, as it has been found inexpedient to be too strict in this particular. It should then be ascertained if the child *habitually* suffers from asthenopia after study, being careful that a correct and thoughtful answer has been secured. This question develops the existence of troublesome hypermetropia, astigmatism, muscular anomalies, etc., while the former question indicates the presence of myopia, astigmatism, cataracts, choroiditis, most cases of strabismus, etc.

If inflamed eyes are not habitual, the vision is normal in *both* eyes and actual asthenopia is not present, the child is not further molested until the next fall examination. But if inflamed eyes are habitual, or the vision is defective in either eye, or asthenopia develops, a card of warning should be sent to the parents urging that an oculist be consulted at his office or dispensary. The principals and teachers should bear these cards in mind and from time to time urge the children and their parents to heed them, though their influence should not be exerted in favor of any particular oculist.

These cards urge the parents to consult an "eye doctor," which is rather a broad expression, but rendered necessary by the fact that many intelligent people do not distinguish between an oculist and an optician, and the cards will go into many homes where dense ignorance prevails. Upon the backs of the cards should be printed the names, addresses and office hours of the different dispensaries.

The fact should in due course of time be chronicled as to whether a pupil has consulted an oculist or not, and the effect that such a consultation has upon his school life, character, physical condition, etc., and when the report is thus completed it should be handed to the Board oculist for presentation to the Board of Education.

This last spring, 25,696 children were thus examined in Minneapolis, of which 8,166 or 32 per cent. were deemed ocularly defective. Amongst these 6,451 *eyes* were found possessing a vision of 20-30; 2,256 *eyes* had a vision of 20-40; 1,214 a vision of 20-50; 1,130 a vision of 20-70; 745 a vision of 20-100; 447 a vision of 20-200 and 43 a vision of 20-0. Four thousand four hundred and seventy-two children complained of distinct asthenopia after study. The individual percentages of defectives in the different schools have ranged all the way from 11 to 67 per cent., the latter occurring in a conspicuously poorly lighted and insanitary building.

One of the disadvantages of this plan is the impossibility of obtaining the most accurate and valuable statistics, such as would be possible if all scholars were scientifically examined by a united force of oculists. But enough is already positively known through the information of principals, duly chronicled in the statistic blanks received May 1, to fully warrant the statement that already over 1,000 pupils have been distinctly benefited through the tests, and the matter is only in its infancy as many children will subsequently seek advice when prejudice, ignorance and carelessness have been overcome, or the days of the long vacation are at hand, with more leisure to devote to ocular consultations.

Copies of the statistic blanks and warning cards are here submitted:

MINNEAPOLIS PUBLIC SCHOOLS.

MINNEAPOLIS, MINN. . . . . 189 . .

Dear Sir: Your child's eyes have been examined by me this day. I believe it advisable to consult an EYE DOCTOR of recognized standing, and if you feel unable to consult one at his office, a Dispensary will do the work free of charge. Respectfully,

[OVER.] Principal . . . . . School.

[Front of Warning Card.]

FOR THE POOR.

UNIVERSITY DISPENSARY—On the University grounds, Medical Building. Hours 12 to 2 P.M.

UNIVERSITY HOMEOPATHIC DISPENSARY—Seven corners. Hours 12 to 2 P.M.

ASBURY HOSPITAL DISPENSARY—Corner Sixth Street and Ninth Avenue south. Hours 12 to 2 P.M.

ST. BARNABAS HOSPITAL DISPENSARY—Corner Sixth Street and Ninth Avenue south. Hours 12 to 2 P.M.

GOOD SAMARITAN DISPENSARY—Corner Seventh Street and Sixth Avenue south. Hours 12 to 2 P.M.

[Back of Warning Card.]

MINNEAPOLIS PUBLIC SCHOOLS.

EYE EXAMINATIONS.

. . . . . School. Date . . . . . 189 . .

Principal . . . . . Examiner . . . . . .

Entire number of pupils examined . . . . . .

Number advised to consult an Oculist . . . . . .

INSTRUCTIONS FOR EYE EXAMINATIONS.

The examination should be made privately and singly, in a room apart from the general school session.

Ascertain if the pupil habitually suffers from inflamed lids or eyes.

Children already wearing glasses, should be tested with such glasses properly adjusted on the face.

Place a card of Snellen's Test Types on the wall in good light; do not allow the face of the card to be covered by glass.

The line marked XX (20) should be seen at twenty feet, therefore place the pupil twenty feet from the card.

Each eye should be examined separately.

Hold a card over one eye while the other is being examined. Do not press upon the covered eye, as the pressure might induce an incorrect examination.

Have the pupil begin at the top of the test card, and read aloud down as far as he can, first with one eye and then with the other.

If the pupil does not habitually suffer from inflamed lids or eyes, and can read a *majority* of the XX (20) test type with *each* eye and does not, upon inquiry, complain of *habitually* tired and painful eyes or headache after study, his eyes may be considered satisfactory, but if he habitually suffers from inflamed lids or eyes, or can not read a *majority* of the XX (20) test type with *both* eyes or *habitually* complains of tired and painful eyes or headache after study, a card of information should be sent to the parent or guardian.

Please examine your entire school by this method, but only such pupils as are thought necessary to send to an Oculist need tabulation in this blank.

May 1 of each year please complete this report and send it to Dr. C. M. Jordan, Supt. of Schools, and a duplicate to the Board Oculist, Dr. Frank Allport, 602 Nicollet Avenue, Minneapolis, Minn.

This will afford you an opportunity to examine your pupils, to note if they follow your suggestions, with regard to consulting an Oculist, and if so to observe the effect upon the pupil's conduct, health, application to study, etc., which you will please carefully, but briefly, note in the proper place in this sheet.

First grade children need not be examined.

No. . . . . Name . . . . . Sex . . . . . Age . . . . . .

Column 1.—Does the pupil habitually suffer from Inflamed Lids or Eyes?

Column 2.—State number of last line seen by pupil with Right Eye.

Column 3.—State number of last line seen by pupil with Left Eye.

Column 4.—Do the Eyes and Head habitually grow weary and painful after study?

Column 5.—Did pupil consult an Oculist and follow his advice?

Column 6.—Briefly describe the results of treatment.

I beg leave at this time to also report some interesting examinations made the past spring. The writer is not aware as to whether men who run electric or cable cars through our cities are examined as to their ocular and aural condition or not, but at his suggestion the Twin City Rapid Transit Company of Minneapolis and St. Paul, operating electric cars in those cities, requested him to examine the eyes and ears of their motormen. The writer feels there can be no question as to the extreme necessity for such examinations in men driving cars through our crowded thoroughfares, and believes that such examinations should be made obligatory with street car companies, in order to protect the life and limbs of citizens. The writer believes that many accidents could thereby be avoided, and that it would be an excellent investment for all street car companies to know positively that their drivers possess good eye-sight and hearing, and to have on file certificates therefor from reputable examiners, produceable in possible litigation.

The standard adopted by the writer in these examinations was, that at least one eye should possess a vision of 20-30; that a watch should be heard by at

least one ear, at a distance of one foot, and that an ordinarily low voice should be heard by at least one ear; and that color blindness should not exist. The writer is confident that these exactions were sufficiently lax, possibly too much so, but the company requested that as much leniency as possible should be shown to old employes, but that *new* applicants for the position of motormen should be subjected to the closest scrutiny.

At the request of the writer the company also agreed to allow old motormen to wear glasses while on duty, in case they were found necessary, but will not extend such indulgence to new applicants.

The writer examined 218 motormen, and found but one color blind individual in that number. Several men had a weak chromatic sense, but were not distinctly color blind. All of the men possessed sufficiently accurate hearing to enable them to carry on their work. Ten men were found with vision below the standard. I briefly submit their records:

No. 1. J. H. V. R. E. = 20/40, with — 0.75 cyl. ax. 90° V. = 20/20.

V. L. E. = 20/60, with — 1.25 cyl. ax. 90° V. = 20/20.

No. 2. W. H. P. V. R. E. = 20/40, with + 0.50 cyl. ax. 90° ⊃ — 1.00 cyl. ax. 180° V. = 20/20.

V. L. E. = 20/60, with + 0.50 cyl. ax. 90° ⊃ — 1.25 cyl. ax. 180° V. = 20/20.

No. 3. J. S. V. R. E. = 20/60, with + 0.50 sph. ⊃ + 0.75 cyl. ax. 180° V. = 20/20.

V. L. E. = 20/60, with + 0.75 sph. V = 20/20.

No. 4. C. H. H. V. R. E. = 20/100, with — 3.00 sph. ⊃ — 1.75 cyl. ax. 170° V. = 20/20.

V. L. E. = 20/100, with — 3.00 sph. ⊃ — 2.00 cyl. ax. 10° V. = 20/20.

No. 5. M. K. V. R. E. = 20/100, with — 1.25 cyl. ax. 180° V. = 20/30.

V. L. E. = 20/60, with — 0.25 sph. ⊃ — 0.75 cyl. ax. 180° V. = 20/30.

No. 6. M. F. V. R. E. = 20/60, with — 1.25 cyl. ax. 90° V. = 20/30.

V. L. E. = 20/60, with + 2.00 cyl. ax. 90° V. = 20/20.

No. 7. C. A. V. R. E. = 20/70, with — 4.00 cyl. ax. 180° V. = 20/30.

V. L. E. = 20/70, with — 4.00 cyl. ax. 180° V. = 20/30.

It will be observed that all of these seven men were enabled, by the aid of properly adjusted glasses, to obtain suitable vision for their occupation. They were therefore allowed to resume their work, with the distinct understanding that they should obtain the glasses, which should be inspected by the writer, and should always wear them when on duty.

Three cases possessed vision so poor as to render them unsafe for the company to employ, and a menace to the public. Their records are as follows:

No. 1. J. L. V. R. E. = 20/50. Unimproved by glasses. Opaque cornea.

V. L. E. = 20/200. Conical cornea.

No. 2. J. T. V. R. E. = 20/50. Unimproved by glasses.

V. L. E. = 20/50. Unimproved by glasses.

No. 3. D. J. V. R. E. = 20/60.

V. L. E. = 20/200. Vision can be slightly improved in each eye by glasses, but not sufficiently to render him a safe employe.

These last three cases, then, were in the interest of the company and of the public, unconditionally condemned and removed from their positions. The company, however, indulgently gave them other employment, so that no hard feelings were engendered.

It will therefore be seen that, out of 218 men, seven were required to wear glasses, three removed on account of imperfect and uncorrectable vision, and one because he was color blind.

In conclusion the writer begs leave to report the examination of ninety locomotive engineers of the Minneapolis, St. Paul and Sault Sainte Marie Railroad. About one hundred still remain to be examined, but have not presented themselves up to the present writing.

When the writer presented the subject to the manager, he was met with the opinion that the men had already been examined by one of the railroad employes, and as such matters were very simply performed he regarded it as sufficient. But upon the writer's urging the value of a medical man's certificate, in case of accident, to say nothing of a sense of added security on the part of the road for a comparatively small outlay, together with the firm belief that such non-professional examinations, while frequently correct, were in no wise reliable, the manager being a good business man, as most railroad men are, quickly ordered the work to be done. The standard adopted was that a man should have at least a vision of 20-30 in one eye, should hear a watch tick at a distance of one foot and low conversation in at least one ear, and should not be color blind. The manager gave permission for defectives to wear glasses when they were capable of bringing vision to a satisfactory standard. This rule applies only to old employes and new applicants will have to pass a more rigid examination. The writer desires to emphasize the fact that all these men have passed the regular railroad examinations as to sight, hearing and color sense, and the results amply confirm the opinion that such examinations are totally superficial, unreliable, inadequate and dangerous. All men passed the aural examinations.

I submit the record of those having insufficient vision:

No. 1. E. D. V. R. E. = 20/60, with + 1.75 sph. V. = 20/20.

V. L. E. = 20/70, with + 2.25 sph. V. = 20/20.

No. 2. J. McG. V. R. E. = 20/40, with + 1.00 sph. ⊃ + 0.50 cyl. ax. 5° V. = 20/20.

V. L. E. = 20/40, with + 1.00 sph. ⊃ + 0.50 cyl. ax. 180° V. = 20/20.

No. 3. M. D. G. V. R. E. = 20/70. Iritic adhesions. No improvement with glasses.

V. L. E. = 20/40, with — 0.50 sph. ⊃ — 1.00 cyl. ax. 15° V. = 20/20.

No. 4. E. W. S. *Has been a locomotive engineer for twenty years.* V. R. E. = *20/100*, with — 4.50 cyl. ax. 100° V. = 20/30.

V. L. E. = *20/200*, with — 4.50 cyl. ax. 85° V. = 20/20.

He states that he sees as well now as he ever has, and the above glasses were simply a startling revelation to him. It is remarkable that he could have passed any kind of a previous examination and could have retained his position for so many years. He claims never to have had an accident attributable to poor vision. He must have been favored with good firemen to assist him in noticing signals, etc., and must have been a man of good judgment and blessed with unusual luck.

No. 5. M. B. V. R. E. = 20/100, with + 1.75 sph. ⊃ + 0.50 cyl. ax. 180° V. = 20/20.

V. L. E. = 20/100, with + 1.75 sph. ⊃ + 0.50 cyl. ax. 180° V. = 20/20.

No. 6. R. B. V. R. E. = 20/40.

V. L. E. = 20/30.

Mention is made of this case because he was under the writer's care in August, 1896, for tobacco amblyopia, at which time his vision was dimly 20-50 in each eye. He recovered with above result, but at this last examination he pledged himself to the superintendent and the writer that he would absolutely abstain from tobacco and intoxicants, and he retained employment upon this understanding.

No. 7. J. H. This man is color ignorant, and at first was thought to be color blind. After several days of instruction he was able to unerringly separate the worsteds; but it is difficult to understand how he passed the road examiner, for he puzzled four oculists.

No. 8. L. G. Distinctly color blind.

No. 9. D. N. B. Distinctly color blind.

It will therefore be seen that out of ninety men, eight defectives were found. No. 6, R. B., who had tobacco amblyopia, will not be so classed. Four men were fitted for their work with glasses. One man was educated in colors, and two men were unreservedly removed from their positions on account of unmistakable color blindness. The road has now directed their firemen to apply to the writer for examination, which is eminently proper, as they occupy important positions and are prospective engineers, and it would be a hardship to them to allow them to serve their apprenticeship with high hopes for the future, and then throw them out when they apply for an engineer's examination.

No. . . . MINNEAPOLIS, MINN. . . . . 189 . .
I have this day examined . . . . . with the following result:
Vision . . . . . Color Sense . . . . . Hearing . . . . . .
I would recommend his employment as . . . . . .
Remarks . . . . . .

FRANK ALLPORT, M.D.

I submit the cards used in these tests, which are of a character to be easily understood by railroad authorities. The word "good" or "bad" is written after the words "vision," "color sense" and "hearing." The railroad authorities do not care to enter into any technicalities. They simply want to know if a man can pass the examination or not. The examiner can make all desirable observations in his private notebook, as they may be useful for future reference. There should be a space between the words "would" and "recommend," where the word "not" may be inserted if the applicant is deemed defective.

Stewart Building, State and Washington Streets.

DISCUSSION.

Dr. HERBERT HARLAN of Baltimore—There is not a great deal for me to say in regard to Dr. Allport's method of testing the eyes of school children because it is almost identical with the method he published a few years ago, and which Dr. Woods and I worked out independently about one year ago. I stated a year ago that as a result of our experience there were several objections to our method. One was that the blank that was sent to the parent by the teacher, after the vision of the child had been found to be less than $^{20}/_{30}$, had a return blank to be filled by the oculist. They were rarely filled, and when they were, it was frequently by opticians and others, and so this year it was omitted. On the notice sent to the parents the wording was something like this: You are advised that this child's vision is below what the Board considers necessary to the proper performance of school duties, and you are advised to consult a physician who makes a specialty of eye diseases. This has been an improvement. The second objection was that last year the examinations were all made at the beginning of the school year, and within three or four weeks every dispensary was filled and it was absolutely impossible for any proper refraction work to be done, so most of those children did not get the benefits they should have had. It has been arranged this year to distribute the work over the eight or nine months of school life. We also found it necessary to drop all the tests for the first grade, which contained all the younger children. We have records of 40,631 cases covering the other seven grades. Blanks were sent to all having less vision than $^{20}/_{30}$ in the better eye. Many of them paid no attention to the notices last year, but the School Board holds that all it is required to do is to place the responsibility upon the parents. It has been shown, quite satisfactorily to me, that in some of the badly lighted schools vision has deteriorated within one year, and I think within five years we shall be able to show what this has been.

Dr. LEARTUS CONNOR of Detroit—Stimulated no doubt by the researches of our friends in Philadelphia many years ago, and those in Minneapolis that have been reported to us, something has been done in many other places. In Detroit it took this form: The Board selected a person interested in child culture, to make the examinations. Those familiar with the latest phase of teaching know that there are people who think it proper also to study the physique of children and to encourage proper teaching in this direction. I think there should be hung over the top of the door of every schoolhouse, "Factory of American Citizens." This person told me last fall that in her own observations she had detected, out of 35,000 children, 3,000 who were unfit to do the work a child ought to do in school. Some could not see, some could not hear and others were defective in other ways. She came to me to see if something could not be done to help them, and as the Children's Free Hospital is organized for that purpose we did all we could. The principals of the several schools have organized a Mothers' League, and they give the mothers of the children, once a month in the schoolhouse, a lecture or demonstration by some physician or scientist. We never shall make progress until we can carry the mothers along with us in this work. The work in Philadelphia had its best fruition in bringing the parents to realize what they could and ought to do to help their children. One of the best contributions to modern medicine was that of Dr. Risley, who showed how correction of the early defects prevented the malignant troubles of later years.

Dr. S. D. RISLEY of Philadelphia—I have said so much on the subject it seems hardly necessary to rehearse the views I have so long entertained. I do feel like expressing the great gratification I feel on seeing this good missionary work being done in the schools. I regard it as of the greatest practical value. I agree with Dr. Allport that the examination must be made in such a way that no suspicion can attach as to any personal benefit to the doctor. If it does, the profession becomes sensitive about it and the family will think there is some ulterior purpose. I would say also that much the same plan as that suggested by Dr. Allport has been outlined in my article on school hygiene which is just about to appear. It is, I am sure, the correct plan.

Dr. G. EDGAR DEAN of Scranton, Pa.—I would call attention to one thing that has not been brought out; that is that the railroad men often while needing glasses do not wear them for the fear of incurring the displeasure of the railroad officials, and I have noticed repeatedly that they refrain from having their eyes examined on that account.

Dr. WILLIAM THOMSON—(Reading a note on the subject) In 1880 the Pennsylvania Railway adopted a complete system prepared by the writer to eliminate from the service men with poor vision, color blindness and deafness, which fully answered the purpose, is yet in use and has been widely copied by other roads. Its details are probably known to you, having been widely published. In the future the roads may be able to place all their examinations in the hands of professional experts who will improve upon the simple apparatus now in use, which supposes one ophthalmic surgeon only to superintend its application. It is believed that a brief report of the extent of the reform will be of interest. From 1880 to 1894 the example of the Pennsylvania Railway had been followed and their system adopted by twenty-four corporations, which controled 38,786 miles of track; eleven companies, using other methods for detecting color blindness, controlled 15,679 miles; thirty-one companies, controlling 29,428 miles, used no tests, and thirty-four companies made no report. The investigation was limited to one hundred of the main roads, controlling 129,970 miles. The so-called color-stick had met with but one criticism, namely, that it was too formal in its arrangement of skeins. This led the writer to propose "A new wool test," described in the *Medical News* in August, 1894. This has been used with the older color-stick and from the best sources of information at hand I estimate that up to Jan. 1, 1897, when the total mileage of the country was 180,955 miles, and the

employes nearly a million in number, this entire system had been adopted by seventy-eight corporations having under their control a total mileage of 106,395 miles of track. The publication of these facts may aid us in persuading the officers of roads now unprotected to adopt either this or some other system for disposing of dangerous employes.

Dr. G. E. SEAMAN of Milwaukee—I do not desire to discuss Dr. Allport's paper in a general way, but only to criticize briefly this card, which I understand is given to every pupil with defective vision. It would seem to me that in view of the spread of dispensary abuse in the cities this is a mistake. It would seem better, if this system is adopted, to take some pains to find out the financial standing of the people, and the teacher knowing the parties well might easily do this and give a card with the address of the dispensaries only to the very poor. If this card is given out to every one it will lead to more dispensary abuse.

Dr. C. D. WESTCOTT of Chicago—The dispensary abuse can be avoided, and the going to opticians also, by suggesting to the parents that they consult the family physician; he is the one I think should always advise in regard to consulting a specialist and the matter then becomes very simple.

Dr. E. E. HOLT of Portland, Me.—If the suggestion of the last speaker be adopted we should have to do some pioneer work among the family physicians.

Dr. ALLPORT—I have been much gratified by the commendation of the different members of the Section concerning this method of examining the eyes of school children. I have been especially glad to hear what Dr. Risley has to say upon the subject. The fact that he has probably had more to do with the personal examination of school children than any of us, adds especial significance to his endorsement of this plan.

The method which Dr. Risley adopted in Philadelphia some years ago was the *personal* examination of all school children in the city by *himself* or his *associates*. The plan which I advocate is the *preliminary* examination of all scholars (except those in first grade) by *school principals*, and then the sending of those deemed defective to competent authorities for further examination. I wish to distinctly emphasize two points: 1. That the method advocated in my paper is not perfect and can never be perfect. The fact that children are simply examined by a school principal and then, if found defective, sent to various sources for further examination, renders the accumulation of scientific data an utter impossibility. Defective children under this method are given a card of warning which they are to take to their parents, urging upon them the necessity of consultation with an oculist. Some of these children may go to a competent ophthalmologist, either at his office or dispensary; some may go to their family physician, who will undertake their treatment; some may go to an optician where they may receive ignorant or dishonest advice; others may go to a department store where worse conditions exist, and still others may not consult anybody. Under these divers and complicated conditions it will be manifestly seen, without further explanation, that the accumulation of scientific data will become an utter impossibility. 2. This method is not advocated for the accumulation of scientific data. It is advocated for the purpose of benefiting the coming generation, and I am perfectly satisfied that if the plan becomes generally adopted that, while subject to many criticisms, while being manifestly and necessarily imperfect, and while not facilitating the accumulation of scientific data, it will inevitably accomplish an enormous amount of good in these United States, and be the means of placing hundreds of thousands of children in better condition to face the various problems of life.

Dr. Harlan's blanks, which he presented at the Atlanta meeting, and has spoken of today, would undoubtedly be valuable if they could be followed up; but inasmuch as these defectives pass into the hands of a great variety of men, who may be friendly or unfriendly to the plan, or broad or jealous in their natures, it will be manifestly impossible to depend upon the different ophthalmologists and institutions in any city to fill out these blanks in a manner to make them at all valuable. Besides this, they are an additional burden upon the principals, who will be sufficiently burdened by the tests themselves and the rendering of the most primitive reports. It has been my aim to eliminate all forms of complication from this plan, and to make it as meager and simple as possible, hoping by this policy to secure its general adoption.

One of the gentlemen has objected to the printing of the names of the dispensaries upon the backs of the cards, fearing a congestion of charity patients. This course has been taken advisedly, after one year's experience. In the first place it is a great convenience to the principals and scholars, and in the second place it emphasizes the fact that free dispensaries are in existence, where people can get proper advice gratuitously, which I am confident will greatly lessen the number of people seeking the advice of opticians. If the dispensaries suspect that individuals are not of the class that should patronize dispensaries, they can very easily eliminate them.

I hope that this ocular examination in schools will lead to tests for color blindness, deafness, and even more extensive physical examinations; but have desired first to secure the adoption of the plan referred to in my paper, and then gradually add to it other material.

SURGERY ONE HUNDRED YEARS AGO.

AN HISTORICAL STUDY

BY DR. GEORGE FISCHER.

DEDICATED TO THE GERMAN SURGICAL ASSOCIATION.

TRANSLATED FOR THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION BY CARL H. VON KLEIN, A.M., M.D.

XX.—GUNSHOT WOUNDS, AMPUTATION, EXARTICULATION, RESECTION.

(*Concluded from p. 146.*)

Let us return to the technique of *amputation* and place a knife in the hand of a German surgeon of the first and second halves of the century in order to learn the most customary methods of operation.

In Heister's time six assistants aided the operator, who girded himself with a "towel." A tourniquet was applied to the main artery and the nerves also compressed with it, in order to lessen the pain. The skin was drawn back as far as possible and a linen cord the breadth of the finger adjusted tightly around the limb somewhat above the point of operation that the muscles might be held together and not cut unevenly. When the patient had drunk a glass of wine or "Kraftwasser," the surgeon made a circular incision with a small knife through the skin and some of the muscles, had the skin drawn up still further and at its edge completed the circular incision with a large curved knife. On the forearm and leg a pointed two-edged knife separated the interosseous muscles. The periosteum was quickly pushed up, the musculature held back by a slit piece of linen and the bone sawed off as high as possible. On the large extremities the vessels were ligated or sutured, but it was thought that in the forearm the hemorrhage could be arrested by a piece of vitriol, a remedy, which indeed, along with the hot iron, was not widely disseminated on account of the pain and danger. Some considered ligature not generally necessary and awaited the closing of the vessels by the coagulated thrombus (Schaarschmidt). A bleeding was made either just before the amputation (Wreden) or, if little blood was lost by the operation, immediately after it (Z. Platner), or when severe inflammation ensued (Heister). The wound was bandaged with dry lint, a piece of puff-ball laid over that, then a fresh calf's or pig's bladder and several compresses. Only on the following day was the tourniquet loosened little by little and, provided no after-hemorrhage occurred, the first bandage was not removed before the fourth day. Later the wound was bound with digestive salve or balsam. At that time they amputated: 1. In case of mortification. 2. In entirely crushed limbs. 3. In incurable caries and spina ventosa. 4. In injures of the art. brachialis and cruralis, if the hemorrhage could not be controlled. 5. In carious and deformed limbs as soon as they became painful.

In the second half of the century some surgeons bound a cord as tightly as possible around the limb just below and others just above the point where the amputation was to be made. An assistant laid upon the main artery a flattened linen roll and pressed it

close with both thumbs. This digital compression, introduced by Louis and adopted by Desault, Richter and the two Siebolds, was preferred to the tourniquet because the latter obstructed the free drawing back of the soft parts before sawing the bone. Instead of the curved sickle-like knife, which Schmucker, for example, still employed, the disadvantages of which Desault was one of the first to point out, the straight knife was used (Pott, B. Bell and Richter). The skin was cut by a special movement of the knife and afterward drawn backward as far as possible, and at its edge a circular incision was made in the muscles as far as the bone. The muscles were also drawn far upward by a slit compress of linen, parchment or leather, so that the bone could be sawed off as high as possible and its protrusion be prevented. The periosteum was cut but it was considered unnecessary to push it back; then the bone was sawed off and the large vessels bound up by means of artery pincers, the small ones with Bromfield hooks. (In regard to the arrest of the hemorrhage we refer to Chapter 14.) One sought first to report a healing by prima intentio, which method proceeded from the English surgeons and was introduced into Germany, especially by Richter. "The chief object of the surgeon in bandaging is to further the healing of the wound by a speedy union. The more the bandage serves this purpose and the simpler it is the better." For this purpose the double circular incision was the preferred method, because by it enough skin was preserved to cover the entire stump and prevent as far as possible the protrusion of the bone. The skin being drawn down was fastened by adhesive plaster laid crosswise, lint laid on that, a linen bag, "English cap," drawn tight over the stump to properly press together the lint and the skin. On both sides a thick compress was laid, which, held firm by a band, pressed the muscles together so that they could cohere; thus the wound formed a somewhat long fissure. By this method, as B. Bell and Richter applied it, a healing by prima intentio was indeed possible, but Bell said it came to pass only rarely and rather in private practice than in hospitals, and that it was the fault of this method to force a healing by sutures and too closely applied plasters. Surgeons soon became generally aware that any pressure exerted by the bandage injured, hence Desault adjusted it as gently as possible. Wardenburg also decried adhesive plasters and compresses, which acted very disadvantageously, and he would only use plaster to hold together the edges of the skin. Pouteau indeed discarded all bandages and left the stump to nature. The suture seemed to have fallen entirely into oblivion although Paré had known it and fastened the skin crosswise. Perhaps he had seen it in Italy, for Maggi, who wrote during Paré's time, mentioned this method quite clearly and said he had learned it from the executioners of Venice, who when they cut off the head of a criminal, brought down the skin previously drawn back, and sewed it around. Sharp and Bagieu again took up the suture. Bandaging was gradually further simplified and the many salves and bandages thrown aside. Larrey covered the stump with pure water with an occasional addition of wine or vinegar, although he could not justify healing by prima intentio, for he regarded it as reliable only in cases of amputations on account of injuries to healthful parts, but very pernicious after amputations on account of chronic diseases. Von Kern left the stump open without bandaging and without suture, only cold applications by means of wet bath sponges or compresses were laid over the open surface of the wound during the first ten hours. Only if the wound was overlaid with plastic lymph he joined the edges of the stump with the greatest care by a few strips of adhesive plaster. If suppuration ensued, warm water was applied. Kern condemned the bandages, in use until then, because they kept the stump too warm and thus induced inflammation and suppuration, mechanically and chemically irritated the surface of the wound, and therefore for the most part prevented prima intentio, and the pressure of the adhesive plaster furthered the retraction of the soft parts. The effect of the atmosphere on the surface of the wound he regarded as not injurious, but on the contrary as useful. The results of Kern's experiments sounded very fortunate. In the second half of the century, according to B. Bell, the indications were as follows: 1. Complicated fractures, when the external conditions of the patient were bad, the fracture ran obliquely, the soft parts were much lacerated or in case of severe hemorrhage. 2. Large flesh wounds with laceration of the main artery. 3. A limb torn off by a cannon ball. 4. Mortification, when it became permanent. 5. White swelling in an advanced stage. 6. Sometimes in exostosis if it caused much pain. 7. Caries with extensive destruction of the soft parts, for without this one might remove the carious bone alone. 8. Cancer. 9. Various tumors which might destroy the soft parts and bone by continued pressure. 10. Stiff and crippled limbs when they cause the patient much suffering.

Until the beginning of the eighteenth century the single circular incision, according to Celsus, was in use; hence, for more than fifteen hundred years it was the only method. The simple flap incision, which Lowdham of Oxford devised for the leg, and imparted in a letter to Young, who published the method (1679) and which was then described by Verduin of Amsterdam (1696), had only just appeared. It was seen that the danger in amputation was very much reduced if the wound was made as small as possible, so that it healed quickly by prima intentio, and suppuration would be entirely or mostly avoided if the protrusion of the bone could be prevented and a thick cushion of flesh retained. With this object various methods were suggested: the circular incision made at two different times by Cheselden and J. L. Petit, the double-flap incision by Ravaton and Vermale, funnel incision by Alanson.

J. L. Petit especially deserves the credit of the *double circular incision.* Proceeding from the principle that only the skin was adapted to a quick junction and the preservation of the muscles affords no essential advantages for the covering of the stump of the bone, he cut through the skin at a deeper point, then when it had been pushed back, cut through the muscles at its edge and drew these up with a slit band. To pare off the periosteum before sawing he did not consider necessary. Louis allowed the protrusion of the bone to depend upon the contraction of the muscles, and therefore enveloped the limb from above downward. This circular bandage came very much into use, but was rejected by some surgeons because it hindered the return flow of the blood, and if it was to be used with success had to be too tightly applied (Richter). The cutting through of the muscles was done in various ways; now with one stroke (Louis), again in layers (Desault); either with extreme relax-

ation of the limb (Portal) or in extreme extension (Valentin). In both ways it was sought to avoid a protrusion of the bone. The covering of the stump by a simple flap of skin was recommended, especially by J. L. Petit, Kirkland and Brünninghausen.

Verduin's *simple flap incision* from within outward found many opponents (Heister, Z. Platner, la Faye and Sharp); on the other hand, the *double flap incision* found many advocates. Ravaton began four inches under the point where the bone was to be sawed through with a circular incision through the soft parts, and by incisions from without inward formed two four-cornered flaps. Vermale discountenanced the circular incision and formed the lobes by two incisions from within outward. The double flap incision was in the beginning very favorably received in France, but was later pushed into the background by the double circular incision which the English surgeons, and especially Larrey, recommended. Desault, Pott and C. C. von Siebold secured with it very successful results; Richter, also, for the upper thigh, preferred a double flap to all other methods.

Alanson of Liverpool (Pract. obs. on amputation, 1779) invented the *funnel incision.* After a circular incision through the skin the knife was passed upward and inward and in this direction around the limb so that the wound received the form of a funnel and its point fell where the bone was to be sawed off. This was an unlucky proposition which found almost no endorsement. Loder was one of the few to praise certain features of this method, while the French surgeons as well as B. Bell and Richter rejected it entirely. The last named called it a fancy of the study (stubeneinfall) as it was not at all possible to make the above described incision.

We must yet notice the *bloodless amputation*, a discovery of Guy de Chauliac, who enveloped the whole limb with pitch plaster and so laced it at the joint that it finally fell off. The Austrian surgeon, Wrabetz, gave a new procedure for this operation (1782). How atrocious it was is shown by the following description: "I had the skin around the healthy part drawn back, bound a cord around the sound portion four fingers' breadth above the elbow, which cord had lain twelve hours in a mixture of spirits of turpentine, tobacco leaves, rue, Spanish fly and camphor, and twisted it with a short stick, applied upon it the mixture in which it had lain, spreading it over the cord upon the arm, along the artery, but applying and fastening a rather long pad in order to obstruct the inflow of the blood. The cord I had twisted more from time to time and in the furrow which it made in the flesh I had a powder of cinchona, myrrh, camphor and alum strewn. The fourth day all the soft parts were separated down to the bone without the least flow of blood, whereupon I sawed off the bone. The stump was healed in five weeks." Wrabetz in this way bound off fingers, toes, hands and feet with success, and Ploucquet of Tübingen recommended it in case of thin and timid people.

The low amputation of the lower leg claimed an especial interest. They were accustomed always to cut it off three fingers below the knee, even if the ailment was limited to the foot, because they considered a long stump inconvenient and did not believe an artificial leg could be applied. Paré had entirely discarded the low amputation and relates the story of a captain who, after he had recovered from it again had his leg amputated in the calf because the stump was too burdensome to him. Even at the end of the seventeenth century Solingen and Dionis advised this amputation and Garengeot asserted that the long stump was no hindrance at all. The practice was, however, entirely forgotten. The first who again showed the practical possibility of this method appears to have been Ravaton (*Journ. de Nandermone*, vi, p. 130, 1756), without, however, having discovered it as he believed. He made several amputations of this kind and argued as its advantages the slight danger, the smallness and quick healing of the wound and the small number of the large blood vessels and nerves, and asserted that with two flaps the operation was very easy. With his artificial leg devised for this purpose the patient could walk conveniently; indeed, one upon whom he had operated made three campaigns afterward. After him Trecourt ("Mém. de Chir.," 1769, p. 256) and especially Charles White ("Cases in Surgery," 1770) came for this operation, with which the latter had several successful results to show. He advised as low an amputation as possible always by means of the lobed incision, but would fasten the lobes upon the stump with court plaster when after some fourteen days the suppuration was in progress and the bones had covered themselves with granulations. He also constructed for the purpose a boot-like apparatus. Since that the low amputation has become established in surgery. On the other hand, if it were a question of amputation just under the knee, some would not amputate at this point but above the knee, because shattering of the bone and caries might possibly extend into the joint, and besides the artificial leg would have a better hold on the thigh (B. Bell and Richter).

Artificial limbs had already been devised by Paré, Fabr. v. Hilden and Solingen. Heister spoke of wooden and silver limbs, which "had been very curiously devised by various mechanics." Besides the above mentioned, one known in Germany as the best was that of Brünninghausen for the high amputation of the thigh. This consisted of a calf made of copper, a heel, middle foot and toe-piece, which were fashioned out of light but firm wood by a sculptor, exactly after the sound foot.

There prevailed a great horror of *exarticulation.* Performed by Fabr. von Hilden, Paré and other older surgeons, and not entirely rejected by Heister and J. L. Petit, in the middle of the century, they had fallen very much out of use. Brasdor, le Blanc, Sabatier, Larrey and others sought to allay the loudly expressed terror and argued that the dangers would be entirely avoided if one cut entirely through the sinewy parts, and that the bone exfoliated slightly and soon became covered with granulation. They considered exarticulation as easily practicable and warmly recommended it.

The second birth of these operations began with the exarticulation of the *upper arm.* This was first done by Morand, senior (1710), then by le Dran and improved by la Faye (1740). In caries and inflammation Heister would never have the large limbs taken out at the joints, but still he exhaustively described le Dran's operation. Later Bromfield and Desault performed this exarticulation with success, and Larrey introduced it into military surgery. Almost every one of these surgeons had his own methods. The circular incision was soon superseded by the lobed incision; Morand, Garengeot, Sharp and Alanson operated with the former. In order to the more easily control

the hemorrhage, la Faye devised the flap incision, which either with forward and backward, or with outer and inner flaps was adopted by Bromfield, Desault, B. Bell and Larrey, and is still practiced. Later Larrey devised the oval method. It was the hemorrhage chiefly which gave rise to the many modifications in the methods. Morand punctured the axillaris subcutaneously with a curved needle and bound the provisionary ligature over a compress in the axillary cavity; he then exarticulated it, bound the artery definitely and released the provisionary ligature. Le Dran recommended that the artery, before the operation, be punctured in the axillary cavity; la Faye advised the continuous binding of the axillaris before the formation of the two flaps. The essential improvement, which controlled the hemorrhages, was the method of Poyet (1759) who, before the cutting of the second flap, which contained the artery, had an assistant reach into the wound and compress the flap. This manual compression, already in use by Desault, has continued to the present day. Bromfield also deserves the credit for compressing the subclavia against the first rib with the finger instead of with the tourniquet, a method which soon found general acceptance and superseded the legion of inconvenient tourniquets constructed especially for that purpose. The technique was extraordinarily varied; some would bind the blood vessels as high up as possible, others as low as possible, so that the flaps would be sufficiently nourished through the side branches; one pared the cartilage of the socket off, another did not because the soft parts united with the cartilage as readily as with the bones. The indications for exarticulatio humeri were caries and shattering of the bone, in consequence of a shot (Alanson with success, 1779). Soon, however, the operation experienced a limitation, since, when the soft parts were affected slightly or not at all, the resection of the head of the humerus was substituted. The exarticulation of the *elbow joint* first made by Paré (1536) and afterward by a Brandenburg surgeon, Chr. Rumphtun (1671) was somewhat outside the usual course. Now it was recommended again (Brasdor and Richter); but it was stated against it that the stump had not a sufficient cushion of flesh, and in the aponeurotic parts a good suppuration never arose (Schmucker). Exarticulation of the hand joint, which it appears was first accomplished by Fabr. v. Hilden, and indeed with the circular incision, was very rare. Heister never made it nor saw it made, and Z. Platner does not mention it at all. Later, in France, it found acceptance, where Sabatier and others performed it with success. On the other hand, *fingers* and *toes* were exarticulated with the greatest partiality, and it was advised that the cartilage be cut through in order to shorten the time of the cure.

The bold idea of exarticulation of the shoulder joint was scarcely sketched out and a few successful cures heard of when courageous surgeons found the exarticulation of the *hip joint* suggested, an operation which demanded the greatest care. The Danish military surgeon Wohler and the Swiss Puthod, both pupils of Morand, had first expressed the idea of this operation, had tried it with their teacher on a cadaver, and in 1739 submitted their proposition to the Académie de chirurgie. Le Dran and Guérin rendered a favorable judgment. Later Lalouette wrote on the subject; he did not consider the operation absolutely dangerous, as the art. iliaca could be compressed, and in his experiments on cadavers, scarcely twelve ounces of the water injected into the aorta flowed out of the severed artery of the thigh. Then Ravaton wished to carry out the exarticulation upon a living person, but was restrained by the consulting surgeons. When the Academy upon the suggestion of Morand, in 1754 called for prize essays on the indications and best technique, among forty-four works submitted, there were thirty which held the operation to be possible. The marine physician, Barbet, received the prize, expressing himself in favor of the operation in case of shattered bones and caries of the neck and head of the femur, and in aneurysm and gangrene. This impelled Morand to make known the work of his two pupils (1768) and to recommend the operation in case of shattering and caries, where it must be regarded as the only way of saving from death. He sought to meet the charge of cruelty and of enormously large wounds and hemorrhages, and argued that the operation had been performed successfully upon three dogs and two sheep. Among the surgeons who championed the operation was, strangely enough, the conservative Bilguer. But he, as well as his translator Tissot, preferred exarticulation to the amputation of the upper thigh. The former indeed recognized the great difficulties, but would in that way avoid the inconveniences of a stump; the latter, from his student's chamber had arrived at the conclusion that the hemorrhage could be more readily stilled in articulation. Pott combatted these views in so far that, although he admitted the possibility of the operation, which he himself had never performed but had seen performed, he however expressed the safe conviction that he would never perform it, because in most cases of caries of the head of the femur the cavity of the joint was also carious. When Schmucker had become acquainted with the difficulties of the operation on cadavers and in cases of fracture, he thought that hardly anybody would be bold enough to carry out the operation, called it the most cruel in all surgery, one which nobody would recover from, and one compared with which Cæsarean section itself was but a trifle.

B. Bell and Richter could not coincide with these entirely dogmatic views. Indeed they did not ignore the dangers, but believed that by the formation of two flaps as the former suggested, they could be overcome, in which way the arteries would be severed deep down, where their diameter was less and a healing by prima intentio could be attempted. For Bell a chief difficulty consisted in the uncertain diagnosis, as one could not know whether the caries extended also to the cavity and pelvic bones, so that the operation might probably result fatally. Besides, if the soft parts were affected slightly or not at all it might be avoided by the resection of the head of the femur, while in case of the destruction of the soft parts the exhaustion of the patient might make success very doubtful. To Richter the exarticulation was very seldom unavoidably necessary. Later Sabatier argued that it caused less pain and occasioned a smaller wound surface than amputation. It is not exactly known who first carried out the exarticulation on a living person, whether Henry Thompson or Perrault, in 1770. The French gave Lacroix the honor; but his operation (1748) performed on a 14 year old girl for gangrene consisted only in a few shears-cuts to sever the extremity; the patient died on the eleventh day. In 1779 Kerr of Northampton oper-

ated upon a girl, who died on the eighteenth day in consequence of pelvic suppuration. Larrey first made the exarticulation in the field, and indeed made it eight times with success, during his twenty-five campaigns.

The exarticulation of the *knee joint* was mentioned by Fabr. von Hilden as a common operation, was discarded by Dionis and performed by J. L. Petit twice with success, and without the occurrence of ill consequences. Brasdor (1774) sought to introduce it again. He considered amputation of the upper thigh in the larger wounds as more dangerous, and did not fear caries of the naked joint surface because the cartilage soon became covered with granulations; he lauded the easy accomplishment and the slight pain of the exarticulation. He recommended the formation of a posterior flap and the sparing of the patella. While Richter recognized the arguments of Brasdor, Schmucker ruled against the exarticulation for the same reasons as in the case of the elbow joint. It did not meet with acceptance at that time. The exarticulation of the *astragalus*, which Sédillier had accomplished without ill consequences, and with quick healing of the wound (1774), also found no approval although Brasdor and Sabatier submitted special methods for it. Amputation above the tarsal bones was preferred. The exarticulation of the *tarsal joint*, the possibility of which von Abbeville demonstrated (1746), was also mentioned by Heister; "the surgeons of today are accustomed in case of a diseased foot to amputate it at the joint with a knife, to separate the toes from the metatarsus, or the metatarsus from the tarsus, or ossa tarsi from each other, so that one could go about again, somewhat, upon the foot as upon a crutch." Its first accomplishment became known through Hunczovsky, who in 1780 when with du Vivier in Rochefort, saw an 8 year old boy whose foot had been severed at the joint for caries, the talus and calcaneum being left. Two months later the patient began to walk comfortably. The operation was forgotten until Chopart took it up anew. He performed it in 1791 and described the practice which has since borne his name. He was followed by Lafiteau and M. A. Petit, the latter of whom observed a retraction of the heel which rendered walking entirely impossible so that he decided upon severing the tendon of Achilles (1799). The exarticulation of all the *bones of the metatarsus*, pointed out by Garengeot and Heister, was first performed by Percy (1789) and was later introduced into practice by Lisfranc (1815).

To the ingenious ideas which were conceived in the foregoing century belongs *joint resection*. Like most great discoveries, this also had its precursors which consisted in the removal of the ends of dislocated joints and in the extraction of necrotic or splintered pieces of bone. It is not without interest to observe how within the space of a few years the beginnings of a conservative surgery converged from two different sides. To save limbs and avoid mutilating operations was the aim, but the ways differed. In the year 1761 Bilguer came forward with his conservative treatment. *In 1768 Charles White of Manchester, gave the first impetus to joint resection with his now celebrated operation.* With it he desired to avoid amputation and exarticulation in many cases, if not to entirely supersede them, as was Bilguer's wish. A 14 year old boy contracted an acute osteomyelitis of the arm, in consequence of which the head of the humerus became necrotic. Ichorous pus, diarrhea and fever had enfeebled the patient to the last degree. Instead of exarticulating the arm, which must have been regarded at that time as the only means of saving the patient, White opened the joint with a single large, longitudinal incision, extending to the middle of the arm, and removed the loosened necrotic head of the upper arm. Improvement began immediately and six weeks later an unexpected firmness was found in the joint. Soon thereafter a piece of the diaphysis separated itself so that from the upper end of the humerus a piece five inches long was lost. The arm was lightly bound without splints or other bandages; indeed, the patient sat in a chair during almost the whole treatment. Perfect recovery ensued and the replacement of the bone was so complete that the arm was only an inch shorter than the sound one and moved freely and could be not only lifted but also rotated. White said, "I think I may safely say, the head, neck, and part of the body of the os humeri are actually regenerated" ("Cases in surgery," 1770; "Philosoph. Transact.," vol. 59 for the year 1769, London, 1770).

The advantages of this operation, through which the exarticulation of the upper arm could frequently be avoided, were too brilliant for his contemporaries to be able to overlook them. In Germany they soon became aware of the great value of this operation. When Richter became acquainted with White's work, shortly after its achievement, he recommended that resection be made as soon as the soft parts had suffered slightly. And the first one who repeated the resection, and indeed on the upper arm, was a German, Lentin. He performed it in 1771 in case of a 14 year old girl for caries, removed at one time almost the whole diaphysis of the humerus, and as a result of bone regeneration restored the use of the arm with limited mobility. Soon E. Platner recommended this operation in case of caries. Foreign countries followed. The Englishmen, Bent and Orred in the seventies performed the resection of the head of the upper arm; the former used the longitudinal incision with two other transverse incisions; the latter, in order to spare the artery, placed a piece of pasteboard under the bone before he sawed it off. The piece which had been removed was replaced by callus and after three months the arm could be moved in all directions without hindrance. In France Sabatier and the elder Moreau especially took an interest in this resection; the latter formed the four-cornered lobe. Percy and Larrey enriched military surgery with it. The latter as early as 1795 was enabled to report to his colleague, Sabatier, nine soldiers for whom the resection of the shoulder joint had been performed by him; Larrey made this operation ten times in Egypt.

If joint resection did not become established as soon as had been expected, this was due to several obstacles: 1. The experiments in France on animals, which were conducted by Chaussier and Vermandois, did not succeed because they spared neither periosteum nor joint capsule. 2. Many surgeons regarded joint resection as equivalent to *resection of the bones where continuous.* This was frequently brought into use in complicated and gunshot fractures, caries, necrosis and pseudo-arthrosis. We have already mentioned that the military surgeons, Bilguer and Theden, also Percy and Larrey in gunshot fractures, frequently laid bare the broken place by large incisions and resected the sharp ends successfully. Large pieces of bone were

fearlessly removed. A. F. Vogel sawed one and one-half inches from both ends of the broken bone, whereupon the arm, without shortening, grew so as to be used; le Cat sawed off three inches; indeed Siegwart of Tübingen removed an entire carious tibia (1770), which became completely regenerated. While W. Hey could also show successes relative to this bone, Moreau, senior, did not succeed in the resection of long carious bones on account of failure of regeneration. Partial resection of the ribs, known even in antiquity, was not infrequent in case of caries (Gooch, Acrel and Percy).

If we turn back to joint resection we find that the next advancement, after White, was made by H. Park, Liverpool. He was acquainted with the operations of his countrymen and made the hitherto unheard of proposition to entirely eradicate the joint, i. e., the whole of the abutting bone ends, and to remove the whole joint capsule or the greater part of it. In this way in tumor albus, suppuration of joints and complicated shot fractures amputation could be avoided and the loss of the extremity prevented. Park's work in the shape of a letter to Percival Pott, dated Sept. 18, 1782, an account of a new method of treating diseases of the joints of the knee and elbow (1783), is surpassingly well written, and is simple and practical. All the objections which could be urged against this method Park believed he was able to overcome, since they were only apparent. The large blood vessels could be avoided readily in the arm as well as in the knee; a violent inflammation was less to be feared in large wounds where all the parts were completely cut through. That a sufficiently firm callus would develop was, after experience in complicated fractures, not to be doubted; on the other hand, the loss of the extensor muscles was of no importance as the limb became ankylosed. Walking with a stiff shortened leg was safe enough and amputation afforded no better chance of removing all disease and preventing relapse. The investigations of Park were limited to the knee and elbow joints. In his experiment on cadavers he made only a longitudinal incision in the knee joint, which White had already established as a principle in case of a shoulder joint and found it sufficient, but had in general difficulty in making it serve. In his first resection of the *knee joint* made on a sailor thirty years old, for caries (July 2, 1781), Park began with a single longitudinal incision, but after several fruitless experiments found a transverse incision necessary, which he made from the middle over the patella. After carefully removing the knee capsule a spatula was applied behind the bone to protect the large blood vessels from the saw. The piece resected from the femur was two inches long; that from the tibia, one inch long. In order to hold the bones close together they laid the limb in metallic splints, stitched the skin together and bandaged it but slightly. A violent, bad smelling suppuration ensued for which a pulp of turnip was applied and cinchona given internally; the fever remained moderate. After four weeks a partially osseous union existed. In its later course several abcesses must be opened. After nine months the bones were firmly united and the wounds healed. The patient walked without crutches with one limb three inches shorter than the other, wore a shoe with a high heel and later went to sea again. Park was well aware that the cure always took a long time and that the operation would not always succeed. (His second knee-joint resection in 1789 proved fatal after four months); therefore he hesitated about suggesting it in the large hospitals of London where complicated fractures were so seldom cured. But amputation also frequently resulted fatally; however, resection which has better chances in injuries than in diseases from internal causes should never supersede amputation, for the latter always deserves the preference where the soft parts have suffered severely or the bone disease has extended far upward.

Park's operation, through which the resection of the knee joint with the presentation of certain indications and a systematic technique, was introduced in surgery (for Filkin of Norwich, who had performed this resection with success in 1762, first published it later), found favorable acceptance. B. Bell endorsed it, although experience must first teach whether the method deserved a general application. It would always remain difficult to prevent the accumulation of pus, the generation of fistulæ, and to fix the limb properly. For this purpose Richter would maintain the limb in a straight position as well as extended and placed no importance upon the shortening. In spite of everything the Frenchman, Lancelot-Haine, pronounced a thoroughly depreciative judgment upon Park's resection, regarded it as very difficult and horrible and said that after much pain, trouble and danger a newly acquired stiff bone was less useful than an artificial one (1787). The resection of the knee joint was first repeated by Moreau, senior, in case of caries (1792). To partial resection might belong the extirpation of the patella, which Theden made in case of a shot fracture, but the patient died of gangrene.

Gradually resection was applied to other joints and anchylosis was regarded as the most favorable result. The greatest credit for its wider development is due to Moreau, senior. who operated upon various joints, in the 80's and 90's, and communicated his experiences to the Académie de Chirurgie (1789). Unfortunately, this body, ruled by prejudice and influenced by Chaussier's unfavorable experiments, showed no interest in one of the most valuable achievements of surgery. Moreau did not allow himself to be terrified; he perfected the technique and operated in his private practice, while the great Parisian hospital surgeons remained indifferent. Moreau, the son, followed in the footsteps of his father and in the Académie de Médecine had the same melancholy experiences. Nevertheless the outcast child of Sabatier, Percy, Larrey and Ph. Roux was sheltered and nursed. In the year 1812 Percy wrote that the number of joint resections accomplished by him, Larrey and other French military surgeons was already so great that one could not count the cases. Above all others the English surgeons should have been interested in the discovery of their countryman; they remained indifferent So the flowering time of joint resections only began in our century.

Extraction of splinters from the *elbow joint* in gunshot fractures, and a partial resection, which consisted in sawing off the humerus condyles in a complicated luxation (Wainmann, 1758), had taken place, when Park proposed the total joint resection. Here he considered a longitudinal incision as not sufficient and a crucial incision necessary. If he himself did not carry out the operation yet he recommended it, as his much more difficult resection of the knee joint had succeeded. After Görcke in a shot wound had successfully made a partial resection by removing the

head of the ulna (1793) and Bilguer had resected the olecranon, Moreau, senior, first performed the total resection in a case of caries in 1794. He made an H-shaped incision, took one inch off each of the three bones and after seven months obtained a cure. He repeated the operation several times and found a follower in Percy, who first accomplished the total resection in a gunshot fracture. The honor of first making an experiment in resection of the wrist, belongs to the Prussian staff physician Beyer. As Bilguer relates, Beyer in 1762, at the battle of Freiburg, removed both under epiphyses of the forearm bones and the ends of the ossa carpi and metacarpi from a wounded soldier's hand, shattered by a howitzer. The hand indeed did not again become so as to be used, and the operation was not a methodic resection; but if it were correctly performed, it deserved to be imitated, as an immobile hand is always better than the stump of an amputated forearm.

The resection of the *hip joint* was proposed by Charles White in 1769 and practiced on cadavers; yet a half century passed before it was carried out on living persons. Vermandois and Koeler of Göttingen, undertook experiments on animals and endeavored to determine the possibility of the operation and its results. Observation at the bedside also contributed to that end. It was seen that in the last stage of coxitis, in case of long standing caries of the head of the femur, this might become loosened naturally, and after its artificial removal a cure might result. Schlichting (1730) after the outbreak of pus and the previous enlargement of the fistula, had removed the whole head; the wound healed after six weeks and the girl could walk again. A. F. Vogel also (1771) in a suppuration of the hip joint removed the bad-smelling pus and found the head of the femur sundered from the neck. The diaphysis with the neck lay upon the oval cavity, where it was allowed to remain and cicatrize. After three months, recovery ensued; the patient could walk about, limping, but without a cane. Fear of the difficulty of the operation may for a long time have prevented its perfect fulfilment; for only in the year 1817 a German physician, Schmalz of Pirna, first applied the knife to the resection. He would indeed have carried it out but found that nature had already sundered the carious neck of the femur so that he needed only to grasp it and draw it out with the hand. In truth, Anthony White of London was the first who carried out the operation, in 1821; he resected four inches of carious femur and accomplished a cure with great mobility and slight shortening of the limb. Oppenheim performed it in 1829 in the Russo-Turkish war; first in a gunshot injury. If we except the removal of luxated or fractured parts of the ankle, which had in all times been performed (by W. Hey, and Kirkland, on both lower leg bones, by Gooch on the tibia, etc.), then the history of the total resection of the *ankle* began in 1792 when it was successfully accomplished by Rumsey in a complicated luxation with fracture of the astragalus, and by Moreau, senior, in case of caries. The resection of one or more tarsal bones did no longer belong among rarities (Moreau, Desault, Hey, Bilguer and others).

Finally resections of the jaw.—Partial removal of a part of the *upper jaw* was accomplished on account of carcinoma (Gensoul); sarcoma and exostosis (Desault). Among those of the *lower jaw* was the exarticulation of one-half of the bone, in the last century, which operation the Austrian military surgeon Fischer first performed in 1793 in a shot wound. A large incision through the masseter and the parotid exposed the proc. condyloideus and coronoideus; the joint cavity was opened and the entire left half of the lower jaw removed, whereupon healing followed. In closing, a remembrance to a German surgeon and namesake!

THE END.

[ERRATA.—In the JOURNAL for March 13, 1897, page 494, second column, nineteenth line from the bottom, the word "peritoneum" should read "perineum;" also, in the JOURNAL for July 31, 1897, page 234, first column, fifteenth line from top, the word "anterior" should read "posterior."]

SOCIETY PROCEEDINGS.

Chicago Academy of Medicine.

A regular meeting was held Nov. 12, 1897, with Dr. A. E. BALDWIN in the Chair.

Dr. R. B. PREBLE read a paper entitled

GASTRECTASIS, WITH A TETANOID CONDITION AND THE SO CALLED PULMONARY HYPERTROPHIC OSTEO-ARTHRITIS OF MARIE.

The case upon which the paper is based is that of a Pole, a male of 32 years, free from all hereditary taints, bad habits and venereal infection. For past six months has complained of eructations, nausea, vomiting, attacks of diarrhea; anorexia, loss of strength and emaciation.

Physical examination of chest negative. Abdomen full and distended, especially in the epigastric region. Marked succussion over stomach. Distention of stomach with gas shows it to extend from normal borders above to hand breadth below umbilicus and far to the right. Urine negative. Temperature of 101 once. The distal phalanges of the hands very much thickened; typical clubbed fingers. A week later returned with tonic spasm of the masseters, the flexors of forearm, wrist and fingers. Arms held against chest, elbows at right angles, thumbs adducted, the fingers flexed in all joints, *i.e.*, an almost but not quite typical spasm of tetany. Reflexes exaggerated, sensation normal, Chvostek and Trousseau signs absent. Has had such spasms at intervals for some time.

The clinical diagnosis made was gastrectasis, with the so-called pulmonary hypertrophic osteo-arthritis of Marie and with a tetanoid condition. The association of gastrectasis with true tetany is rare, with incomplete tetany or tetanoid condition more common. The common theories of the etiology of tetany were reviewed, especial attention being given to that of auto-intoxication. The efforts of various experimenters to discover the causal toxins in the gastric contents and their failures so far were reviewed. Gumprect failed in a recent case to discover any pecular toxic bodies in the urine of such a case. The urine, however, showed twice the normal toxicity. The clubbing of the fingers, in the absence of any other demonstrable lesion, was referred to the gastrectasis. The popular explanation of this condition is, that it is due to the action of absorbed toxins upon the bones. The source of these poisons is oftenest a bronchiectasis or empyema, but they may be absorbed from other places as cysto-pyelonephritis, the intestines in dysentery. This case is the first example where the source of the toxins seemed to be the stagnating contents of a gastrectasis. An X-ray photograph showed that the bulk of the thickening was in the soft parts rather than in the bones. The bones, however, showed some excrescences and were also more transparent than normal, probably the result of a rarefying ostitis, such as is often seen in this condition.

The case is of interest because it shows in one individual two conditions of uncertain etiology, both of which are generally believed to be due to an auto-intoxication of the organism with toxins. Secondly, it would seem to be a connecting link between rachitis, a nutritional disturbance in which the bones are affected and which is often accompanied by tetany and the tetany of adults, which until now has not been seen in association with osteal changes, apparently due to the condition which caused the tetany.

DISCUSSION.

Dr. FENTON B. TURCK—There are some objections to the word tetany as used in these cases. It is to be borne in mind that some of these patients have exhibited signs of tetany and have at other times manifested almost the epileptic form of convulsions. I wish to present tonight the reason, so far as my observation goes, of what I believe to be the cause of this

disease, and also to report two or three interesting cases in my own experience. In all cases of true gastrectasis we will find a marked atony of the stomach with hypertrophy of the pyloric orifice. In other words, we have obstruction of the pylorus *plus* atony of the stomach wall. In other cases we have primary hypertrophy of the pylorus when compensation occurs, the wall becomes thicker and stronger, but subsequently results in true dilatation. The pathology of true dilatation is markedly different in many of these cases. The round cell infiltration that occurs produces the true dilatation. The round cell infiltration, resulting in atrophy, usually begins in the glandular area and extends into the muscular tissue, this condition necessarily causing retention and stagnation. The micro-organisms already present there have abundant opportunity to develop, resulting in putrefactive decomposition and fermentation. These toxic products, whether we have tetany or not, found in a patient's stomach, will produce tetanic convulsions when injected into animals. Evidence derived from frequent experiments I have made, leads me to conclude that in many of these conditions we can prove a toxic condition of the stomach contents. I have made a series of experiments on the stomachs of soldiers in the regular army, in the normal condition, and have compared them with various cases of dilatation and retention, which show decided hypertoxicity of the stomach contents. In these cases there is another condition to which I would call attention, namely, starvation. It will be remembered that Van Gieson referred to this starvation as being a form of intoxication, and that we have coupled with this a lowered vitality and resistance to the action of the poisons, which is the second condition that must be considered. A third condition which I wish to call attention to in this class of patients which I have observed is that there is usually a "neurotic tendency." The patients themselves have not the inhibitory power that we find in other patients manifesting similar conditions of gastric dilatation. I mention these three factors to be considered as relating to tetany.

A word or two as to diagnosis. The method that has been heretofore practiced is simply that of outlining the organ by the use of gas or air introduced into the stomach. This is faulty from the fact that the gas or air will frequently pass into the intestines, and percussion will show the stomach as if located further down or to the right than would be shown by direct methods. The use of the electric light (Einhorn's method) is valuable in the hands of an expert, but it is impracticable for general practice. We know that the use of the gyromele (revolving sound) affords us exact evidence of the size and location of the stomach in every case.

I wish now to report a case that was referred to me by Dr. C. S. Bacon in 1893, in which I found hypertrophy and stenosis of the pylorus with marked dilatation of the stomach and stagnation. On examining the stomach contents I secured 800 c.c. of fluid. A peculiarity of these cases, which is often noted, is that upon the introduction of a stomach tube a convulsion sometimes follows. In this case there was no convulsion after passing the tube until the patient had returned home, when I found him in a condition simulating opisthotonus. I found contraction of the jaws, the arms flexed upon the breast, and in this rigid condition the patient seemed to breathe heavily, the pulse was rapid and the temperature 101.5 degrees. Subsequently he had two or three lighter attacks, but following the tetany the attacks became more epileptiform in character. The patient was treated for a while and compensation occurred, *i. e.*, the stomach wall became thicker and stronger and the food passed out of the stomach into the intestines normally and in time, and the symptoms disappeared. But some time after the symptoms reappeared and it was decided to do a pyloroplastic operation. The Heineke-Mikulicz operation was performed and from that time the symptoms entirely disappeared.

The second case was one which resembled the first in some of its manifestations and was sent to me by Drs. Ferguson and Sanger Brown. Mrs. S. had had more or less epileptic attacks, but there was a peculiar form of tetany in this case which occurred in the abdominal muscles. A clonic spasm would make its appearance and then was followed by a tetanic spasm until contractions occurred so markedly as to extend to the arms and involve the jaws. The peculiarity in this case was that the symptoms began in the abdominal muscles.

A third case was sent to me by Dr. Cuthbertson and was that of a woman who had hyperemesis of pregnancy and the patient had had a previous history of two or three attacks during which she could not open her jaws. In her case there were mild periodic attacks of tetany. She was treated and we found such a large mass of sarcinæ that the other physicians thought it was pus. I withdrew something like two liters in two days. The patient, after being observed a week, had an attack of tetany which commenced with difficulty in swallowing, at 3 o'clock in the afternoon; at 5 o'clock the jaws were closed, at 6 arms were involved, and then the legs, and at 9 she died from tetany. In the meantime I brought with me tetanus antitoxin, thinking it would have some effect on the tetany, but it produced no effect.

There is one point I wish to mention, and that is, in most cases associated with gastric tetany there is either a total obstruction or the pylorus is so narrow that material can not be forced into the intestines. In all cases of this character we should advise operative interference at once and perform the Heineke-Mikulicz pyloroplastic operation.

Dr. JAMES C. KIERNAN—In dealing with these conditions the two hypotheses can very well be combined that have been advanced by Dr. Preble and Dr. Turck. There are few cases, especially among the conditions hinted at by Dr. Preble, in which neurasthenia with its consequence and its gastric expression is unlikely to occur. Dr. Turck has hinted at a large number of cases being neurotic. The last case which he reported was, I think, one of puerperal tetanus and not tetany, as I understand the term. The condition of tetany is by no means rare, as Dr. Preble has remarked, in children, not merely with reference to rickets, but with regard to an expression of both nerve tire and irregular nutrition which is recognized now to a considerable extent as one of the underlying factors of scurvy. The conditions which today are placed under scurvy of the infant and charged to diet were some years back charged to innutrition, many of them being placed under the condition known as piliosis rheumatica nodosum, whose dermic lesions resembled the ecchymoses. In many of the cases the true condition known as tetany, or, as I have been accustomed to term it, tetanilla, is to be found. Neurasthenia, either attacking the sound organism or one which is already neurotic, is by no means rare in Europeans. It was quite common with its gastric phenomena in the male and female shoemakers in Lynn, Mass. Nearly forty years back there was a condition so closely resembling it there that it was first described as epidemic, and then as endemic. This so closely resembled tetanilla that it could be placed under the same category. It was then charged that a good many of the conditions were due to dyspepsia, and dyspepsia in those days meant a large number of neurotic states charged up to these gastric conditions. In dealing with these and allied conditions of the intestines the fact is often ignored that they are not primary, but secondary to a constitutional condition. Glénard, when he dealt with enteroptosis, did not take into account the fact that very frequently nerve tire and allied conditions preceded the neurasthenia to which he charged them. This would seem to serve as a predisposing factor. With regard to the direct etiologic factor I can see good reasons, from what is known of many of the morbid products (call them alkaloids, toxins, leukomains or allied products), why they should produce this condition. Certainly the occurrence of tetanilla in connection with infantile scurvy or rickets bears out Dr. Preble's position as an exciting factor of this kind.

Another thing which is purely hypothetic is whether interference or partial inhibition of the functions in gastrectasis may not produce the temporary, or, in some cases, permanent atrophic changes to which Dr. Preble has referred.

Dr. PREBLE (closing the discussion): It was not my intention to enter into the pathology of gastrectasis. The case, simply as one of gastrectasis would have no interest, and only little interest as one of gastrectasis with tetany or a tetanoid condition, but because we find here a tetanoid condition with drum-stick fingers, both apparently due to a gastrectasis, the case seemed to me to be worthy of record. I must accentuate again the criticism manifested in regard to Dr. Turck's use of the words tetanus and tetany. One condition is absolutely distinct from the other and they should not be confused. The last case mentioned by Dr. Turck would seem to be one of tetanus rather than tetany, and if so, it has no place in the consideration of this subject.

In regard to his first case there are one or two things which attract my attention. In the first place I have never seen opisthotonic convulsions with tetany, nor have I ever heard of them occurring with it. There is, however, a functional neurosis often accompanied by opisthotonic convulsions, namely, hysteria, and with hysteria we frequently have epileptoid convulsions. It might, however, be that she had tetany, and associated with it epileptoid convulsions. The line between the two can not be so nicely drawn as to say that she had tetany and later on an epileptoid condition. It is more interesting to note that in these cases the masseters are more frequently involved than in ordinary cases. Tetany as it occurs in normal individuals, especially in shoemakers, is rarely accompanied by spasm of the masseters. The external muscles of the eye may also be involved in the spasm, but not

as often as the laryngeal muscles, particularly the laryngeal muscles in rachitic children.

Dr. Kiernan spoke of a condition which resembles tetany as being observed in the factories of Lynn. I am much interested to hear of these cases, for tetany seems to be rare in this country. I saw a number of cases abroad, so that its clinical picture is familiar to me, but I have not seen one here. This case is not typically tetany at all. The most we can say is that we have tetanoid conditions. So far as I have seen (and my opportunities for observation have not been ideal by any means) the case lacks two important signs, namely, spasm following pressure over the large vessels or nerves, and facial phenomena. These are absent entirely.

In regard to the use of the word tetanilla, I never heard it employed until Dr. Kiernan used it, and then I was interested enough to look it up. I found the word tetanilla was proposed by Trousseau many years ago, but in his lectures he makes no use of it. He makes use of the word tetany only. One has to hunt the dictionary or monographs upon tetany to find the word tetanilla at all.

AMPUTATIONS AT THE KNEE JOINT.

Dr. Wm. Cuthbertson—This is an operation of considerable antiquity, having been advised by Hoin in the last century and reintroduced by Brinton, Velpeau, Markoe and others.

In discussing amputations at the knee, various causes requiring the operation must be taken into consideration before determining the operation to be performed. It is a foregone conclusion that in all crushing injuries, such as railroad accidents, limbs being caught in machinery, wounds of the femoral or popliteal arteries, the incision must be made according to the extent of the destruction of tissue or the location of the arterial wound. Again the amount of shock resulting from the injury must be considered as a determining factor, it being a well known fact that the higher the point of amputation the greater the shock and consequent mortality. The third determining factor is the ability of the patient to procure a prosthetic appliance to replace the loss of the amputated limb.

It should be imperative that the line of suture in all cases of amputation at the knee joint should be behind and not across the end of the stump.

MORTALITY OF KNEE AMPUTATION.

An analysis of a mortality table compiled by John Ashhurst, Jr., M.D., in the International Encyclopedia of Surgery, Vol. 1, 1888, gives a death rate of 50 per cent. A later compilation by the same author in 1895 of seventeen cases with eight recoveries and nine deaths gives a mortality of 52.9 per cent., or a total mortality in both series of 52.4 per cent. These cases comprise operations for all causes.

A further analysis of these statistics shows that of seven amputations by the antero posterior flap method through the knee joint, four died and three recovered, a mortality of 57 1-7 per cent. Amputation by the same flap method through the condyles of the femur, nine operations were performed with five deaths and four recoveries, a mortality of 55 5-9 per cent.

From statistics of the Civil War 132 cases are reported with 64 deaths; mortality 48.4 per cent. Of these, 49 were primary with 16 deaths, a mortality of 32.6 per cent. Brinton gives 62 cases for disease with 14 deaths, a mortality of 22.6 per cent. Max Schede gives in civil practice for injury 314 cases with 103 deaths, a mortality of 32.8 per cent. For disease 124 cases with 30 deaths; mortality 24.4 per cent.

Rioblanc (year book 1897, page 229) gives the records of 85 cases of Gritti's operation with a mortality of 19 per cent.

He states not one of the deaths was due to the operation but to other causes. A further report of this operation gives 25 cases for injury with 4 deaths, a mortality of 16 per cent.; for disease 196 cases with 5 deaths, mortality 26.3 per cent.

Amputations through the condyles of the femur: For injury 111 cases with 40 deaths; mortality 36.1 per cent; for disease 60 cases with 15 deaths; mortality 25 per cent.

Totals: Simple disarticulation, 648 cases with 220 deaths; mortality 3.3 per cent. Gritti's operation, 306 with 13 deaths; 4.2 per cent.

Amputation through condyles of femur, 171 cases with 55 deaths; mortality 3.2 per cent. Grand total, 1,125 cases with 228 deaths; mortality 2.50 per cent.

The age of the patient has a distinct bearing on the mortality of the operation; other things being equal, children stand amputation better than adults, the reason being, in my opinion, in addition to a better constitution, as a rule, the shock is lessened by the child not being aware of the enormous loss it sustains through the amputation of the limb. The operations which would seem to meet with the most favor are the following:

1. The antero-posterior flap method, formed by cutting an anterior flap, beginning the incision near the back of the tuberosity of the tibia, curving around the front of the knee from one to three inches below the tubercle of the tibia and ending at a point half an inch below the head of the fibula. The ligamentum patellæ is reached, divided, the knee flexed and the lateral and crucial ligaments cut through; the knife is slipped behind the joint, an outward cut made and a short posterior flap formed. The edges of the flap are united, which brings the line of cicatrix well behind the condyles of the femur. In this operation the patella is preserved and, in my opinion, the articular cartilages of the femur should also be retained.

2. The bilateral flap method of Stephen Smith: An incision is made beginning below the tubercle of the tibia, curving downward and forward around the outer side of the leg, inward and backward to middle of leg, then upward to the popliteal space. Another incision, a counterpart of this, is made on the opposite side of the leg, the joint opened and disarticulated and the edges of the wound united by interrupted silkworm gut sutures.

3. Cardens' operation, in which a large anterior cutaneous flap is made. The deeper structures are divided down to the bone above the patella, the posterior incision is made, transversely from without inward on a level with the base of the anterior flap; the lateral and crucial ligaments are cut, the limb divided and the edges of the skin flap sutured.

4, is Stokes' modification of Gritti's operation. A long anterior and short posterior flap is made, the bone sawed through above the condyles, the posterior surface of the patella denuded with a small saw, the freshened surfaces of the patella and femur brought into apposition and sutured by catgut passing through the muscles of the thigh and the margin of the patellar structures.

A great objection to this operation is the sliding of the patella on the end of the femur and its annoyance to the patient as well as the danger of non-union occurring between femur and patella. I have obviated this by peeling back the periosteum from the lower end of the femur and, after approximating the femur and patella, sewing the periosteum to the margin of the patella. This makes a clubbed end to the femur and strengthens its attachment to the patella. Drainage should be used in all amputations at the knee. That operation which retains the patella is the preferable one. I am also of the opinion that all injuries which necessitate immediate amputation should be operated by the antero-posterior flap method with simple disarticulation, as this is the most easily performed. In operations of election, Stephen Smith's lateral flap or Stokes' modification of Gritti's should be selected; the latter, in my judgment, being preferable in robust persons, as it requires so much more time to perform, the lateral flap method being restricted to weakened constitutions.

The operation of simple disarticulation with preservation of the patella affords an excellent stump for bearing weight and in indiscriminate cases is the preferable operation. Gritti's operation leaves a bad stump, as the edges of the wound almost invariably become painful through pressing upon the socket of the artificial limb. Stokes' modification of this operation with the femur sawed through about two inches above the condyle, is a much preferable operation.

In all of these operations the skin should not be allowed to become adherent to the bone, as it is certain to cause pain and discomfort by being dragged upon by the artificial limb. Hence the advisability of preserving the patella.

The tendency of the patella to retract on the front of the thigh can be obviated by severing the quadriceps tendon above the patella.

(To be continued.)

French Association of Urology.

This association held its second annual general assembly at Paris in October, with Prof. Guyon in the chair, and a large attendance, including many foreign corresponding members of the association. In the address on "Hypertrophy of the Prostate," Carlier remarked that the five hundred cases on record in which castration has been performed, show a remarkable variety in the results obtained, some extremely successful and others entire failures. The consecutive mortality is quite large, 19 per cent., probably due to the previous physical condition of the patients. The operation has succeeded in cases in which there seemed scarcely any hope and has failed in others in which it seemed urgently indicated. It is difficult to explain the retrogression of the lesions if we accept Launois' theory that they are due to arterio-sclerosis, but if we adopt Albarran's suggestion that the hypertrophy of the prostate is a hypertrophic cirrhosis of glandular origin, we can understand

better the atrophy of the enlarged prostate after castration. Motz has found that 63 per cent. owe their hypertrophy to the abundance of glandular tissue. Arterio-sclerosis was not observed in the cases in which the glandular tissue was extremely abundant, nor even in those in which the glandular tissue formed one-half of the section. But the clinic is not able yet to differentiate between the hypertrophy due to glandular tissue and that due to the connective or muscular tissue, or sclerosis. Castration has accomplished many remarkable cures, and often induces a rapid decongestion of the prostato-vesical apparatus, but its uncertainty, with its other disadvantages, forbid it a brilliant future. Resection of the vaso-deferentia is still more unreliable, and he thinks it probable that well-managed catheterization would have reduced the congestion of the prostate, as well as the vasectomy, in the successful cases. The future of this operation is therefore no more promising than that of double castration. Albarran described a new operation, which he calls "Angioneurectomy of the Cord." It consists in resecting for a short distance all the elements of the cord, with the exception of the vas deferens, the artery of the vas, and one or two of the accompanying veins. He has performed it on numbers of dogs and in three months the testes were completely atrophied. The prostate at the same time showed generalized atrophic lesions similar to those secured with double castration. This operation has been performed on a patient, but too recently to announce the results. Legue observed that if vesical contractility is entirely gone, intervention is useless. It only promises success when the lesions are recent and probably not severe. In incomplete retention with diminished but not suppressed vesical contractility, he has obtained excellent results with both castration and vasectomy. Desnos reports the observation of 296 elderly patients with urinary troubles. In 220 the prostate was enlarged. Among these there was retention in 112 and 108 without. Under the age of 65 there was retention in 14 to 80 without. Above this age the proportion was reversed, 98 with retention to 28 without. Examination of 76 patients with retention, but without enlargement of the prostate, showed the same relative proportion in regard to the age. The conclusion seems to be that the prostatic hypertrophy is not a factor in the retention of urine, a conclusion evidently exaggerated, but still not without significance. The recent results reported show for castration seven brilliant successes (Legueu, Chevalier, Loumeau and Motz); two complete failures; three much improved. Loumeau noticed a decrepitude and weakness in his two cases afterward greater than the age warranted. His 21 vasectomies did not affect the functions nor the condition of the prostate in any case. Carlier reported 9 satisfactory vasectomies. Motz 3 vasectomies; 1 case cured; 1 not benefited, and 1 died in seventeen days. Nicolich 27 vasectomies; 8 completely cured; 3 still continue to have sexual relations; 14 improved; 5 unaffected. One vasectomy was reported in which the patient was relieved of some calculi at the same time, and possibly the marked benefit derived may have been due to this fact. No new cases of psychic disturbances from either castration or vasectomy were noted in the reports presented.

Carlier reported a case of tumor in the left kidney the size of a man's head with periodic attacks of hematuria but no other disturbances. The general health is perfect, although the patient has been carrying the tumor for ten years. He queries whether the result would have been any better after nephrectomy than at present. Chevalier described a case in which one kidney had been removed for uropyonephrosis, followed later by a similar condition in the remaining kidney with total anuria and grave symptoms. Lumbar nephrotomy released an enormous quantity of urine and the patient recovered at once, although the fistula persists to this day and all the urine is discharged through it; Chevalier considers it the safeguard of her health, as renewed tension of the kidney would certainly terminate fatally and advises keeping the fistula open the rest of her life. Bégouin stated that absolute anuria from calculi lasting forty-eight hours should be treated like a strangulated hernia. If medical treatment (morphin, electrization and massage of the urethra, elastic compression of the inferior members, etc.) energetically applied, is not followed by success in a few hours, an operation should be performed withot delay. Legueu and Donnadieu consider five days the longest limit of delay. Numerous incidents were related in which intervention at the fifth to seventh day were followed by death. Although the operation had succeeded in restoring the functions, it had been too late to save the patient from uremic intoxication. "The importance of varicocele in the diagnosis and prognosis of renal tumor" was confirmed by Legueu, who has established that the compression of the spermatic vein is not produced by the tumor, but by degenerated ganglia. The varicocele is only the external manifestation of the secondary adenopathy, and bears no proportion to the size of the tumor. If a cancer therefore is accompanied by a varicocele, the conclusion should be that there is already ganglionary propagation. This conclusion attenuates the hopes based on the small size of the tumor, and if operated, the ganglionary masses should be removed with it. Eraud's address on "Non-gonococcic Uretritis" emphasized the prevailing tendency to consider that specificity comes less from the species, whose rôle is rapidly dwindling in importance, and more from the poison, which is constantly acquiring greater significance. He concluded with the statement that the problem is more complex than hitherto supposed. Along with the polymorphism of the microbes there is the question of the toxalbumins, scarcely outlined as yet, which may locate farther still the mechanism that we have been ascribing to the single rôle of the microbe; in other words, behind the microbe hides the poison. Hogge urged that greater attention be paid the prostate in cases of primary urethral suppuration, as its anatomic conditions render it especially liable to react to inflammation. Carlier and Daret observed that the vesical phenomena accompanying renal tumors and tuberculosis must not be considered a counterindication to surgical intervention otherwise called for, as they frequently are but a reflection of the renal trouble and subside with it. J. Albarran confirmed the success of his cystoscopic catheterism of the ureters already announced, and Sorel described a form of neurasthenia in which acute retention occurs periodically, cured by catheterism. Boursier suggested that a bath will sometimes cure these cases if catheterism is difficult.

PRACTICAL NOTES.

Pruritus an Early Symptom of General Paralysis.—Sarbo has observed two cases in which an intolerable pruritus was the first symptom of the disease.—*Semaine Méd.*, from *Pesth. med. chir. Presse.*, Sept. 12, 1896.

Parenchymatous Injections of Alcohol in Actinomycosis have been found a valuable adjuvant of the potassium iodid or surgical treatment. If they do not cure directly they render the foci more amenable to other treatment, especially surgical intervention.

Thyroid Chlorosis.—Capitan believes that certain forms of chlorosis are traceable to disturbances in the thyroid gland, and has found marked improvement follow iodin treatment, and also that the patients were almost entirely cured in four to five weeks on administration of iodothyrin tablets.—*Semaine Méd.*, December 22.

Buckskin Dressing for Eczema.—Davesac has found that buckskin applied over the salve, fits smoothly to the surface, yielding to every movement, never rots nor produces erythema, does not absorb the salve and does not stick to the tissues, while it is easily washed and keeps the dressing moist inside and dry without, and the scabs leave a healthly surface when they drop off.—*Semaine Méd.*, December 22.

Radiography of the Skull.—Contremoulins' apparatus locates a foreign body in the skull with absolutely mathematical accuracy, but its expense forbids its general use, although it is highly endorsed by several members of the Paris Acad. de Méd. Approximate accuracy is secured by Mergier with a very simple and inexpensive apparatus, which has rendered invaluable service in the hands of Pean and others. He first quarters the field with two straight wires at right angles, which alone is a great help in locating the foreign body.—*Bulletin de l'Acad. de Méd.*

Liebmann's Method of Treating Stuttering.—A hundred severe cases cured in the brief space of four weeks are reported by A. Liebmann of Berlin (*Memorabilien*, November 13). He has the patient repeat sentences after him, drawling the vowels and pronouncing the consonants sharp but distinctly, maintaining the conversational tone throughout without any rhythm, and avoiding the singing tone altogether. When the patient finds himself thus speaking several sentences fluently at the first sitting the psychic stimulus is immense. The method can be applied to quite small children.

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SATURDAY, JANUARY 22, 1898.

THE MEDICAL CARE OF THE SEAFARING CLASS.

The U. S. Marine-Hospital Service has in late years come into such notoriety in connection with the proposed establishment of a National Department of Health that its proper office has quite dropped out of sight. A considerable number of educated people, even among the medical fraternity, believe it to be an institution for the care of sick *marines*, and many others, who are cognizant of the Marine Corps as a part of the United States Navy, identify it with the medical department of the naval service, and infer that this association with National vessels and through them with foreign countries where naval officers are brought in contact with the breeding-places of the great maritime pestilences, justifies the assignment to it of the duties of a seaboard quarantine. This confusion of function has been one of the obstacles in the way of the establishment of an organized independent National Health Department. The officers of the Marine-Hospital Service know nothing practically of these alien pestilential breeding-places; they have no reason to know it. Their duties properly restrict them to the treatment and care of the sick and disabled seamen among the crews of merchant vessels, at the commercial ports on the sea-board and lake-board. The U. S. Marine-Hospital Service was created for this purpose and for this solely. Its hospitals have been built and dispensaries and sick-quarters established for the benefit of the crews of merchantmen only, as U. S. Naval Hospitals receive only the officers and crews of men-of-war and other National vessels, the sailors and marines (sea soldiers) of the U. S. Navy. For this medical care of the mercantile class, Congress has appropriated liberally and the numerous Marine Hospitals have been erected well equipped with every modern appointment and officered by a corps of carefully selected, thoroughly competent physicians and surgeons of deservedly high repute in the profession. In the organic law, instituting the Marine Hospital-Service, this was all it was expected to do. The relegation to it of quarantine duties, a part only of the responsibilities of a National Health Department, has come about without predetermination, and now that the wisdom of such an assignment is contested, the claim is made that the material for such a department exists within the Marine-Hospital Service, which can be developed without much further expense to the Government. An establishment already equiped as this is, it is said, can do all the work required without change of personnel, additional expenditure, or interference with the other duties of the officers to be diverted to it.

Can this be so? Is it possible that the officers of this strictly hospital corps can be detached from their original and legitimate duties to assume this charge without the appointment of others to take their places? Why should the physician employed to take care of the sick of the vessels of the merchant service be sent to foreign countries and located at foreign seaports and consulates? With better reason, medical officers of the U. S. Navy might be detailed for this duty. Is there any other reason for the hybrid sought to be consummated than the accidental one that the officers of the Marine-Hospital Service are employes of the Treasury Department, which Department has control of the commerce of which these merchant vessels are the carriers. There is very evident disposition at Washington for each department to extend its operations in every possible direction and any attempt at abridging this amplification is resented. As sick sailors were taken in charge by the Marine-Hospital Service and cared for in the Marine Hospitals in cases of ordinary ailments when they were affected with communicable diseases of the pestilential class, it was taken for granted that this Service was the proper one to consider the means for the prevention of their communication; and as this evidently was a matter of National cognizance, involving, as it did, foreign relations, the need was admitted for some uniformity in the provisions for the inhibition of these maladies as menaces of the public health; and as other diseases were no less prejudicial to the general health, the necessity for their restriction and control was recognized and it was evident that the department which had the power to hinder the spread of foreign-born communicable diseases should also have control of these, and hence the assumption that the Marine-Hospital Service was that specially endowed epartment. Thus, step by step this Service has strayed farther and farther from its proper field, and the time

has come when the medical profession shall consider whether the National sanitary interests do not demand something else for their administration than the makeshift adaptation of a bureau specially constituted for other purposes.

But quarantine is only a small part of the matter; there are great and important functions for the new department quite outside of quarantine and irrespective of it which can not be performed satisfactorily by the Marine-Hospital Bureau.

Happily the State boards of health are examples of such an organized establishment for the Nation as they are for the States, a National Department of Health harmonizing, unifying, connecting and supplementing all these in accordance with the representative character of our American institutions. The Department of Health as at present proposed simply creates an independent bureau, such as the Department of Agriculture was before its chief officer became a cabinet officer, and such as the Department of Labor now is. An *ad captandum* appeal for the sympathy of the medical profession has been made in the gratuitous assumption that the advocates of the bill before Congress, which has the *indorsement* of the AMERICAN MEDICAL ASSOCIATION, the American Public Health Association and the State boards of health, are urging the creation of a Department of Health with a politician instead of a physician as its chief. Were there but one physician in the United States eligible by reason of recognized ability as a sanitarian to be chief of such a department this might be feared, but as long as such men live as WALCOTT and ABBOTT of Massachusetts, STEPHEN SMITH and RAYMOND of New York, ROHÉ and WELCH of Baltimore, MATHEWS and MACCORMACK of Kentucky, HOLT, WILKINSON and OLLIPHANT of New Orleans, HORLBECK of Charleston, PORTER of Florida, and the multitude of able and experienced sanitarians of the Northwest, who drew their inspiration from the illustrious JOHN H. RAUCH of Illinois, all physicians, there is no reason to fear that an honest, intelligent, able and impartial President of the United States, such as is the present incumbent, will ever call to this high office a man who is not physician as well as politician, using the latter word in its honorable and legitimate sense of "one versed in the science of government." The Supervising Surgeon-General of the Marine-Hospital Service has abundant opportunity for the administration of his own bureau, and were he ten times as able he can find therein all that he can do, if he do that all well. *Ne sutor ultra crepidam.*

TO HELP THE CAUSE, let each member of the ASSOCIATION write his Senator and member of Congress at once in regard to this matter. If it is understood that the *whole* profession really take an interest in the matter the local lobbyists at Washington will be powerless to stop the reform.

THE SURGERY OF THE THYROID FROM A NEUROLOGIC STANDPOINT.

In a suggestively written paper in the January number of the *American Journal of the Medical Sciences*, Dr. J. J. PUTNAM uses the following words: "We are rather in the habit of assuming that the removal of large portions of the thyroid does no harm, provided it does not cause myxedema. But the probability is that we shall learn to recognize affections which lie between myxedema and health, as well as peculiarities of development and disorders of nutrition for which the thyroid is more or less responsible." . . . That this is a statement of fact will hardly be disputed by any neurologist, but that it expresses a truth that has as yet been insufficiently impressed on the profession generally is another fact the importance of which is not likely to be over-estimated. It is only within a comparatively brief period that we have learned that the thyroid had any definite function and our knowledge of its physiology is still very far from being exhaustive. The dangers also of interference with it are as yet also only partially known, but it is certain that they are not confined to the operation itself. The cases of sudden fatal dyspnea occurring hours after an apparently prosperous operation in Graves' disease, recently reported by DEBOVE and others, are in evidence of this, and Dr. PUTNAM adduces other important facts and arguments against any too venturesome surgery of the thyroid gland. Among these are the experiments of HALSTED showing that excision of the gland in dogs had a serious and very evident disturbing effect upon their offspring and that even very slight operative interference produced hypertrophic changes and apparent increase of secretion in the gland itself; and the observations of KOCHER of goiter and cretinism inherited from parents with no disease other than impaired thyroid function are also cases in point. Still another fact brought forward by PUTNAM is the one that removal or atrophy of the thyroid in infancy checks the growth and function of the reproductive organs, and gives rise to the various disturbances of development that follow the suppression of this very important function. The close relations of the various internally secreting glands, the thyroid, the testicles and ovaries, the suprarenal glands, and the pituitary body, for this it seems probable must be included in this category, are revealed in many pathologic conditions and the thyroid as the largest, and presumably the most important, has apparently a larger part in the disturbances than any of the others. It seems to be involved to some extent in many cases of acromegaly; its relations with the genital development have already been mentioned, and its implication in many pathologic conditions of organs is probable and is strongly suggested by the clinical history in certain cases of Graves' disease. SEELIGMANN has indeed recently reported a case of

this affection apparently closely associated with genital disorder in which he obtained decided benefit from the administration of ovarian extract, thus adding another suggestion to the therapeutics of the disorder.

When any organ is removed, as PUTNAM says, two factors are set in operation which may have more or less important effects upon the system generally. One of these is the action of toxins, the other is the effort of the organism to adapt itself to the new and changed conditions. The first of these is important enough in the case of removal of the thyroid gland, but the other, from what we are beginning to know of its physiology, must be even more important. Because the function of the organ is already deranged it does not necessarily follow that matters will be remedied by its removal. The operation may only make a bad matter worse. The mortality of thyroidectomy, according to PONCET, is from 15 to 30 per cent., which is alone enough to induce caution. When the facts brought forward by Dr. PUTNAM are also considered, the known and the possible and hinted though yet unknown effects of thyroid ablation, there is still more reason for prudence and hesitancy in this operation.

Of course when a goiter has become a dangerous mechanical embarrassment to important functions, or when a tumor exists in the thyroid that by its growth and situation has become a threatening danger, the case is clear and operation may not only be justifiable but necessary. It is in such affections as Graves' disease, in which thyroid operations are still somewhat popular, that we are likely to have not only useless but dangerous surgery, and the time seems to have come to emphasize the cautions implied in Dr. PUTNAM'S paper. The theory of hyperthyroidization in this disease, though it has apparently much in its favor, is not yet sufficiently demonstrated, and even were it so would not form a justification for any indiscriminate or frequent practice of operative interference. Graves' disease is not by any means a hopeless disorder under medical treatment, even in its advanced stages; it is therefore impossible to say when surgery is indicated as a last resort. When the facts of its absolute inefficiency in perhaps the larger proportion of instances in which it has been tried, the immediate dangers of the operation which are not slight, and the remote ones pointed out by Dr. PUTNAM, are all taken into consideration, it would seem that it ought to be relegated to innocuous desuetude.

ON THE PRESENCE IN THE BLOOD OF FREE GRANULES DERIVED FROM THE LEUCOCYTES, AND THEIR POSSIBLE RELATIONS TO IMMUNITY.

H. F. MUELLER[1] of Vienna recently described certain small, round, colorless granules as constantly present in the fresh blood. These granules were regarded as entirely distinct from the blood plates. This observation did not seem at first to attract very much attention. In the last number of the *Bulletin* of the Johns Hopkins Hospital WM. R. STOKES and ARTHUR WEGEFARTH publish an article from the Bacteriological Laboratory of the Health Department of Baltimore, in which they state that they have confirmed MUELLER'S observation, and in which they recite a number of very interesting experiments that appear to throw considerable light upon the much discussed question of the relation of the leucocytes to the bactericidal properties of the blood serum and to immunity.

MUELLER described these bodies as small, round and colorless, about the size of the finest fat granules. They are highly refractile and show a dancing molecular movement, but have no independent motion. MUELLER concluded that these granules are normal constituents of the blood, but he does not consider them as oxyphile or neutrophile granules that have escaped from the leucocytes, and he leaves the question as to their fatty or albuminous nature open. STOKES and WEGEFARTH were able to demonstrate these granules in the fresh blood taken in dispensary clinics and otherwise from about 500 persons. Having observed that these granules occurred in all specimens of blood examined, the question naturally arose as to their origin. It was noticed that when examined by artificial light, as for instance by means of the Welsbach gas burner, the granules resembled very much those found in the protoplasm of the oxyphile and neutrophile leucocytes. When a blood specimen is surrounded by vaselin so as to prevent drying and then exposed to a temperature of 35 degrees C. for an hour or more, the granular leucocytes became actively ameboid, the granules in the neutrophile cells become very lively, and the number of granules in the blood plasma becomes perceptibly increased. The characteristic dancing motion of the granules of the neutrophile leucocytes is shown very well by simply mixing the drop of blood with an equal amount of distilled water containing 1 per cent. of alcohol. The investigators believe they have noted that these granules may leave the protoplasm of the ameboid leucocytes.

Under similar conditions the granules in the oxyphile (eosinophile) leucocytes also show a tremulous motion, though less vigorously.

The blood of various animals was also examined as regards the presence of these granules, and it was found that the observations made concerning the human blood are in the main applicable *mutatis mutandis* to the blood of horses, rabbits, cats, guinea pigs, rats, frogs, fishes, etc. These observations strengthen the conclusion that the granules of the oxyphile and neutrophile leucocytes may appear as free bodies in the blood serum.

[1] Centralb. f. allg. Path. u. path. Anat., viii, 1896.

After reviewing the two principles in regard to immunity, viz., METSCHNIKOFF'S well known theory of phagocytosis, and the theory of those investigators that attribute immunity to the bactericidal properties of the blood serum and to the extracellular action of the leucocytes, STOKES and WEGEFARTH detail certain investigations for the purpose of determining whether there existed any difference in the bactericidal power of fresh blood serum before and after it had been filtered through new sterile Müncke filter cylinders. From these experiments it appears to be demonstrated that the filtration of the serum of the guinea pig and rabbit through new porcelain filters removes its normal power of causing the agglutination and cessation of motility of many motile pathogenic bacteria and of destroying large numbers of these organisms. This power can be restored by adding to the serum leucocytes, free granules and red blood corpuscles. As the red blood corpuscles are not regarded as bactericidal it follows that the restoration of the bactericidal power is due to the leucocytes and free granules, and that these cells can furnish bactericidal material.

Having demonstrated that the leucocytes not only contain bactericidal substances, but also under certain conditions can give up the power of their protoplasm to the surrounding medium, it naturally became tempting to try to show by means of some experimental proof that the germicidal substance and the granules that leave the leucocytes are related or identical. This proof is, however, extremely difficult to furnish. STOKES and WEGEFARTH added the typhoid bacillus to various normal bloods and serums, but did not notice any distinct attraction of the bacillus for the free granules. Having immunized guinea pigs against the typhoid bacillus and adding a 24 hour culture of motile bacilli to the fresh blood of such animals it was found that the bacilli became motionless and clumped, and that in about fifteen minutes fine granules could be seen around the periphery of the clumps and in the meshes of the massed organisms. Often several granules could be seen about a certain bacillus. It will be recalled that VAUGHAN and NOVY[2] extracted a germicidal nuclein from the serum, which they think is derived from the leucocytes, and that HANKIN[3] believes that the granules of the eosinophiles gradually become dissolved in the serum and thereby furnish the protective substance or alexin found in the blood serum. The work of KANTHACK and HARDY[4] is also very suggestive in connection with this phase of the subject.

Upon injecting anthrax bacilli into the various lymph sacs of frogs they found that the destruction of bacteria could be divided into two distinct stages: In the first oxyphilic leucocytes approach the chains of bacilli. These cells then apply themselves to the surface of the bacilli and discharge their granules by quick, streaming motions, when the bacilli begin to show signs of degeneration. Then follows phagocytosis of the degenerating bacilli by the hyaline cells. STOKES and WEGEFARTH repeated these experiments and found that any distinct clinging of the oxyphiles to the anthrax bacilli did not occur, but that the cells very soon appeared to contain much smaller numbers of granules than before, and that many large (oxyphiles) granules could be found free in plasma, as well as small, dust-like granules which they believe are derived from the polymorphonuclear (finely granular) leucocytes. They conclude, therefore, that it seems likely that the free granules both from the oxyphile and the finely granular or neutrophile leucocytes may weaken and destroy anthrax bacilli by their presence in the plasma, and that the work of destruction is completed by phagocytosis.

The many suggestive facts which have been hinted at imperfectly induce our authors to advance the following theory: First, the bactericidal power of the leucocytes of the blood and the serum of man and many animals is due to the presence of specific granules, derived especially from the neutrophile and oxyphile granular cells. Second, in order to resist the action of invading bacteria the granular leucocytes can give off their granules to the surrounding tissues. Third, this throws light on the bactericidal powers of cell-free fluids, and this mode of production of alexins also offers an explanation of the hyperleucocytosis of infection. At the same time the supposition or observation is not disproved that leucocytes can act as phagocytes and take up bacteria either while alive or after they have been destroyed by the germicidal granules. It seems to us that these investigations are of especial interest, because they appear to throw additional light upon the protective and adaptive processes that occur in the reaction of the organism to local and general infection, and because they in a measure reconcile the two theories that obtain in regard to the mode that these protective mechanisms perform their functions, namely, that of intracellular action or phagocytosis and that of extracellular action due to the microbe-killing powers of the serum. The investigations also open up an apparently fertile field for further studies in regard to these important phenomena as they occur in the various forms of infection and intoxication.

[2] Ptomaines and Leucomaines, 1896.
[3] Centralb. f. Bakt., xii.
[4] Phil. Transactions, clxxxv, 1894.

MEDICAL LIBRARIES.

In going over a list of the principal public medical libraries of the country one is struck with their peculiar distribution. We notice one in Maine, another in South Carolina, a third in Colorado, while between lie many more populous States, some of them known as centers of medical education, without any public medical library at all.

Considering more closely the towns in which some of them are located the facts are yet more striking. For instance, in Maine the library is situated in Brunswick, a town of 6,000 inhabitants, the twelfth in point of size in that State. It belongs to the Medical School of Maine, Bowdoin College, and by the figures before us is larger than any other medical library in New England, outside of Boston. Again we find the Medico-Chirurgical Faculty of Maryland has a very respectable library, while scarcely one of the larger State Medical Societies has anything of the sort worth mentioning.

Medical libraries have not developed in response to certain peculiarly favorable conditions confined to large cities. It seems clear that most of them have been built up by the activity of a very few individuals, sometimes aided by a local institution or society, sometimes without any aid whatever. They are in many instances enduring monuments of the work of a single member of our profession, who perhaps was, apart from this, the busiest, most overworked man in his community.

These facts should be brought prominently forward because of the encouragement they give to others to take up this line of work. It seems that in almost any town in the country the conditions render possible the formation of a good medical library and wherever one is formed it will be a lasting public benefit.

The subject is one of real professional interest, and we are glad to learn that Dr. C. D. SPIVAK of Denver is collecting facts for a more complete account of the medical libraries of the country than now exists, to be brought before the coming Meeting of the ASSOCIATION in that city, and in due time to be laid before our readers. It is to be hoped that those who have given thought and labor to the subject will use this opportunity to place many valuable suggestions before the profession.

Dr. SPIVAK has himself suggested an important idea and has carried it into practical effect in connection with the Colorado Medical Library Association of Denver. He prepared a card catalogue of the medical works to be found in the private libraries of that city, which were not represented in the public medical library. In this way he was able to add more than 6,000 volumes to the medical works generally available for reference to the profession of Denver.

Some such plan might be followed in any large town or city and would be of very wide benefit to the profession. The essence of a reference library is to have the books obtainable, with some ready means of knowing just where each is to be found. It is not necessary that they should all be collected under one roof and one ownership. It is only necessary that their titles and location should be furnished in a well-arranged catalogue.

Probably in every city in the country may be found several private collections of medical books. Even where large public libraries exist they lack many valuable books of reference that might be found on the shelves of private libraries in the same city. A card catalogue representing all of these books, and giving their location and the hours at which they might be consulted, would furnish each of these cities with a good practical reference library, or greatly extend the value of the library it already possesses.

The work of preparing such catalogues should be done by the younger members of the profession; they can furnish the time and energy, their older colleagues can furnish the books. Only bring the two together and a great professional benefit will result to both. The physician with a large private library finds with each addition to it an increasing difficulty in remembering just what he has to refer to and comes to feel keenly the need of a good catalogue; which he can not supply for himself, and can not secure without the aid of some one with a medical education. The catalogue of his own books would be worth far more than the inconvenience of having them consulted by others would ever cost; and to have with it also the access to all medical works in his city that he does not possess would be a practical extension of his library that he could not hope to accomplish in any other way.

On the other hand, for the young man who will take up this work of cataloguing, the opportunity is one of unmixed benefit. In arranging and classifying the medical books in the catalogue, he will be arranging and classifying the facts of medicine in his own mind; and at the same time learning just where he can put his hand on any particular reference when he wants it; and acquiring for all practical purposes (when he most needs it), a library such as he could never hope to buy for himself, no matter how great his professional success in after life.

With the private medical libraries of a city thus connected by a catalogue it would be almost certain that with the death of an individual owner his collection of books would not be allowed to become scattered or sold as waste paper. But the necessary effort would be made to secure them for permanent usefulness, in the possession of some medical society, or general public library, or educational institution, there to develop by accretions of similar sort into a true public medical library.

Will there not, before the time of the Denver Meeting, be other cities to report experience with Dr. SPIVAK's plan?

CORRESPONDENCE.

The Lepra Conference Again.

NEW YORK, Dec. 15, 1897.

To the Editor:—Dr. Dyer, one of the editors of the *New Orleans Medical and Surgical Journal*, has published on his

return from Berlin, where he attended the Leprosy Conference, not only a very accurate (I have the Berlin *Wochenschrift* before me) report of the doings of the Conference, but also a very curious one. It has a quality, which I'll be bound, will not be encountered in any reports of the same events, now being published or hereafter to be given to the world by his European colleagues; it will be found even, or rather especially, outside of the profession intensely amusing. Would those Teutons, Latins, Scandinavians, Slavonians, have ever imagined that the novelty of their European festival, the great men assembled in the capital of Germany, the beer and the emperor could violently *wake to ecstasy the living lyre* of a Yankee (as they call all Americans)? This ebullition of Pindaric lyricism (for has not the author come back, as it were, from the Olympian games; not, indeed, with palms and bays, but with that precious badge?) is not, however, the only condiment (excuse mixed metaphors) with which Dr. Dyer has tried to give flavor to his tale. Something of a more pungent nature seems to have been required by his literary taste, *das Strenge mit dem Zartem*; it would be ridiculous to doubt that Dr. Dyer understands so much German. He thus conceived the happy idea of having a Turk's head, at which he might pound away for the delectation of his audience, and perhaps, who knows? to make good some harmless boast uttered in the blissful trance of those never to be forgotten days—that he would settle the hash of his Yankee colleague (give him time to return!) and let him have it right down the neck. Dr. Dyer, in fact, has gone out of his way to throw out at me a handful or two of vague and rather obscure obloquy. Does Dr. Dyer really think himself such a deep-rooted authority because, forsooth, he belongs to what he ludicrously calls the *personnel* of the Berlin Conference, that he may safely dispense with knowing himself what he means when he girds at his neighbor? "The relation," says the New Orleans member of the Berlin *personnel*, "of Ashmead to the Berlin Conference was well shown when a resolution of his relating to a conference in 1898 was quietly dropped without discussion. Ashmead wrote in the *Sei-I-Kwai*, in far-off Japan, a vituperative article which reflected upon the intelligence, upon the purpose and upon the ability of the *personnel* of the Conference in Berlin."

First, then, Dr. Dyer avers that Dr. Ashmead wishing to proclaim his contempt of certain European personages (who ought to have been sacred to him, as they are to Dr. Dyer), of their *intelligence*, their *ability* and their immediate *purpose*, conceived the extraordinary idea of going to *far-off Japan* and there (probably at the foot of the renowned Fujiyama) blazed away and relieved his bile by unlimited vituperation. The imputation of such nonsensical conduct I consider as downright slander. If there is anything that I feel obliged to say (even if it should be vituperation) I am not in the habit, as my friends and even the others will testify, to run to the "Flowery Kingdom" or to the antipodes. The fact is, that the article in question was published February, 1897, in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, *and that reprints of it were sent to all known (to me) European leprologists.* The *Sei-I-Kwai Medical Journal* of Tokio reprinted it July, 1897. Dr. Dyer, in a passage which I shall quote presently, speaks in a very indefinite and puzzling manner of *Ashmead and his methods.* Is this mention of my article, as *published in far-off Japan*, an instance by which we may judge *Dr. Dyer and his methods?*

As to the quiet dropping of Dr. Ashmead's resolution relating to a Conference in 1898, it does not by any means, whatever Dr. Dyer says *show Ashmead's relation to the Berlin Conference.* This rash assertion is simply the result of careless ignorance. All those with whom Dr. Ashmead has been in correspondence with for the last two years in relation to the Leprosy Congress know better. The relation of Dr. Ashmead to the Conference is shown by the presence in it of twenty-two persons who represented their governments respectively. I do not wish to explain again here Dr. Goldschmidt's and my own idea of an international committee, formed by delegates of the different nations interested in the question of leprosy. I have, single-handed, fought for that idea and in a large correspondence discussed it with men of all parts of the world. Both Hansen and Ehlers were against it, and I say nothing that I can not prove. It did not obtain a complete triumph, I am sorry to say, but that it was, at least in a certain measure, successful no one can seriously deny. In this, modest as the victory may seem, appears *the relation of Dr. Ashmead to the Conference.*

"Ashmead conceived the Conference, and because men of world-wide honesty and reputation were making it a success, he tried to discourage interest in it by writing abuses of these men. In justice to Goldschmidt, to Hansen, to Arning, to Lassar and to Ehlers, who suffered most, the above should be said. Goldschmidt allowed himself to be led into the organization of a conference because of the objects aimed at and washed his hands of Ashmead and his methods as soon as he saw behind the veil.

"This was the end of the eventful Lepra Conference, one which Ashmead ridiculed because he was not ring-master and manager as well as director, etc."

When Dr. Dyer states that Dr. Ashmead, after conceiving the Conference tried to discourage interest in it he does not seem to understand what an incredible mental phenomenon he is describing; this statement, which seems to Dr. Dyer quite natural and needing no further explanation, hardly requires to be seriously refuted; for am I not writing these lines in my office and not in a lunatic asylum? However, some persons who have been either disgusted or offended or abused by me are quoted. The reader of the *New Orleans Medical and Surgical Journal* is informed that shocked by the wickedness of my ways, Dr. Goldschmidt at last determined *to wash his hands of me.* It is clear that he was for a long time in utter ignorance of my nefarious proceedings, for he has written to me and encouraged me for the best part of the last two years, complaining of some persons considerably more than I did myself. However, it occurred to him *to look behind the veil*, and then he did not hesitate one moment to perform those condemnatory ablutions. But what did he see behind that metaphoric obstacle to sight? Evidently nothing but the constant, laborious, undismayed activity with which Dr. Ashmead was and still is trying to call the attention of the public to the possibility of stamping out by international arrangements a disease, of which as Dr. Dyer says, 2,000,000 of men are the victims, and which threatens the other millions. But why should I be accused of veiling what I was unremittingly proclaiming with all my might? O, Lord, clear our style of metaphors!

But there are others, and I ask myself with sincere searching whether I ever blasphemed (it could not be called with a milder name) against Hansen. When I most displeased this eminent leprologist was, to the best of knowledge, when I intimated that the microscopic creature on whose discovery his great fame rests, has distinguished itself by gigantic ingratitude, inasmuch as it has never done anything in return for all the regard, study, observation, cultivation, etc., which have been lavished on it. That is hardly abuse. I also said that Hansen had been compelled, *nolens volens*, to swallow the diluted delegational idea. That is the truth, and if it was not it would not be abuse, it would be a lie, or perchance, a mistake. And Arning? He and I are on the friendliest terms, which I am ready to show, if required. And Lassar. Let Dr. Dyer indicate one passage in any article or pamphlet of mine in which he was abused. I am not quite so sure, I admit, about Dr. Ehlers. I made, in speaking of him, a very few and, in my intention and opinion, very harmless jokes, for instance, about the 159 lepers he looked at in

Iceland. Was this joke or abuse? Dr. Dyer's article first conjured up that doubt in my mind. Ought not he to know? Is not he a judge? Who among his numerous readers will ever forget his delicate appreciation of Dr. Virchow's attic joke, when this venerable sage expresses his regret not to have been informed at an earlier period that free beer was to be had for the asking at the lunch counter!

There is, however, in these lunges of Dr. Dyer, made with what I take the liberty of calling a vicious but also ridiculous carelessness, one which claims a little more attention. It remains for me to explain to Dr. Dyer's readers, should they come across these lines, what must, if they take Dr. Dyer *au sérieux*, rather startle them. How could Dr. Ashmead, in New York, aspire to be the ring-master (whatever that may be) and manager as well as the director of the Berlin Lepra Conference? And yet, this is easy to answer. Dr. Dyer means that Dr. Ashmead in every article he wrote for a long time insisted upon one point, from which he never swerved for one moment, that the Conference, or Congress as it was originally called, could only do one thing that was useful: obtain the enforcement everywhere of absolute isolation and the enactment of laws preventing the contamination of one country by another; that every thing else was vanity; that what would be said and read in the Conference and printed by the authority of the Conference, could be said, heard and printed everywhere without conference; that the time for talk should be freely admitted to be past, and that the mind of those who attended the first Leprosy Congress should rise to one great conception, easy to understand and easy to carry out and infinitely salutary to mankind. This is what Dr. Ashmead repeated indefatigably and, no doubt, he irritated some people.

There was once at Rome a senator who believed that the safety of his country depended on the destruction of a certain town in Africa. This man allowed no influential person to remain in ignorance of his views, and proclaimed them in and out of season after every one of his speeches in the senate: *Carthago delenda est.* Yet no one ever suggested that he intended to become the ring-master, manager and director of the republic. Dr. Dyer, happily, did not want to destroy Carthage, and could enjoy himself without getting at loggerheads with everybody.

"I was waked by the band Sunday morning and saw a host of soldiers going to the palace for new flags, and they marched merrily and looked well and they were men. Long live Berlin! Long live the Emperor! Long live the Lepra Conference and its work!"

Suppose now I should indulge in some banter like that of which I rendered myself guilty against the renowned *privat docent* of Copenhagen, this dithyrambic gush, this touching imperialism (which might draw tears from a stone), and even the innocent enjoyment of the medal (reproduced in Dr. Dyer's paper) which informed those whom he met in Berlin that the bearer was a member of the Conference and that his name was Dyer, would suffice for a little string of light pleasantry. But it might be abuse. Perhaps even quoting Dr. Dyer might be construed into abuse of him. ALBERT S. ASHMEAD, M.D.

Appendicitis.

DETROIT, MICH., Jan. 11, 1898.

To the Editor:—In the January 8 issue of the JOURNAL I found an article on appendicitis, by an old practitioner, opposing operation and advising conservative treatment.

The article refutes itself, as the report of eight cases with five recoveries and three deaths, or a mortality of 37 5 per cent., is so terrible that if surgeons would report any such mortality, a hue and a cry would be raised which could be heard across the continent. I simply want to call attention to it for fear that the article might have been overlooked. It is the same old story. By conservative treatment a good many cases will recover, and about 15 per cent will die. This man's statistics are far worse.

There may be surgeons who are ambitious and inexperienced and who consequently operate when a patient is convalescing and there is no need of it, but every experienced abdominal surgeon will refrain from operating when the patient is recovering, but will postpone it and urge an operation in the interval. However, all experienced surgeons urge *immediate* operation upon every case, claiming that if all cases are operated upon the mortality will not be more than 2 to 5 per cent. Although in that case a certain number will be operated upon who would never have another attack, still they can not be distinguished beforehand, and we claim best results by prompt operation in every case as soon as diagnosticated. Of those five cases which recovered in the article spoken of, four will have recurrent attacks; some will die with the second, some will die with the third, or the fifth, or the tenth, but all will die from appendicitis, not to mention the long continued illness and the suffering they undergo in the meantime. So that out of eight cases there will finally be one who will live and have no recurrences, and all the rest will be dead. While if the eight cases had been promptly operated upon the first day, seven at least would have recovered and not been in danger of any subsequent attacks, and one might have died.

With this and the other side of the question, any reasonable and conscientious member of the AMERICAN MEDICAL ASSOCIATION can easily decide which is the correct method of treatment.

Yours truly, J. H. CARSTENS, M.D.

X-Ray Blindness.

NASHVILLE, TENN., Jan. 10, 1898.

To the Editor:—Though possibly it may already have been mentioned, I am not conversant with any report on what may be called X-ray blindness. During the Centennial Exposition here this summer there were several X ray machines in operation. One of these was attended by a gentleman of my acquaintance, of more than average intelligence and observation, and also possessed of a fair amount of electric knowledge. He tells me that out of about 3,500 persons who looked into the tungstate of calcium screen, at his hand or other object, four were unable to see anything. They were not only unable to see the bones of the hand or other objects more or less opaque to those rays, but they could not even distinguish the fluorescent light; the interior of the box was just as dark to them as before the light of the tube was turned on. These individuals he allowed to make a number of trials, even bringing them back at night, so as to avoid the disturbance of daylight, but without avail; the screen remained persistently black. My acquaintance learned, also, that the general agent who installed the machines, possessed the same peculiarity. This gentleman said that though he had tried many times he had never been able to see anything in the screen. This condition, it seems to me, is one that would not be unexpected. The eyes of some individuals read, abnormally, certain colors, and that there should be some eyes unable to grasp the X-ray is no more remarkable than the phenomena of color blindness.

ERNEST B. SANGREE, M.D.

Another Interesting Case: An Impacted Quid.

CHICAGO, ILL., Jan. 15, 1898.

To the Editor:—The case reported by Dr. Tufts of Sioux Falls, in which death was caused by the sudden plugging of the bronchi with a quid of chewing tobacco, recalls a less tragic case in my own experience.

A number of years ago I had a paper-hanger at work for me, who was using as a stage to reach the ceiling he was decorating, the top of a ten foot partition. Busy at his work with his head

thrown back as he looked directly above, he failed to notice that the board on which he was sitting was insecurely placed.

I had been watching the man, but had gone perhaps seventy-five feet away, when I heard a mighty crash, but no outcry. Calling out and receiving no reply, I hastened to the spot to find my man perfectly livid and completely unconscious. My first thought was that he had been killed, so free was he from all motion; no gasping and struggling, just an inert mass of flesh and blood.

The thought ran through my brain as I pulled his vest open to reach his heart, which, just as in Dr. Tuft's case, was beating, was that the distance the man had fallen had not been sufficient to produce such seemingly disastrous results. What was the trouble?

The man's mouth was open, and from it trickled a little tobacco stained saliva, hint enough to warrant my cramming my fingers down his throat and fishing out a great wad of moist fine cut that was simply packed in the back of the mouth, covering the trachea and extending down into it.

Hastily turning the man upon his face and giving him a few hearty thumps on the back, I had the satisfaction of seeing my patient within fifteen minutes cough himself back into lusty but somewhat profane existence.

The moral of my tale and that of Dr. Tufts is that the emergency physician should look out sharply for impacted quids.

JOHN E. BEEBE, M.D.

Bureau of Public Health.

UNITED STATES SENATE,
WASHINGTON, D. C., Dec. 23, 1897.

To the Editor:—Your favor of the 16th inst. has been received and read with interest. I note what you say with reference to the united effort on the part of the medical profession of our State, supported by the medical men throughout the country, in favor of the establishment of an independent bureau with a commissioner to be appointed by the President at its head.

There is no class of professional men in this or any other country more entitled to the highest consideration than that of the medical profession. Upon that profession the people always rely in times of physical distress in their everyday life, or in times when contagious diseases seize and threaten the lives of the people of a locality and the communities surrounding it, among whom the malady is likely to be spread.

I therefore should be very glad to be of service in any reasonable direction looking to the support and encouragement of the medical profession and also to the interest of the whole people. I think we have within a year or two had evidence that those in authority have failed in the performance of their whole duty in protecting the lives of the people against the ravages of yellow fever in certain portions of our country.

Wishing success in the conduct of the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, I am, sincerely yours,

S. M. CULLOM.

National Legislation on Sanitation.

MILWAUKEE, Dec. 29, 1897.

To the Editor of the New York Medical Journal:—In an editorial in the last issue of your valuable *Journal* there appears the following statement: "The American Public Health Association bill seems to us a retrograde measure. It would involve a departure from all existing methods of departmental work. It would create, to stand between the executive of the department and the management of an epidemic, a deliberative body of forty-five men whose opinions would have to be had before action could be taken."

Permit me to state that this is not the meaning or intent of the measure at all. It is intended that rules and regulations can be made by the department concerning which every State and Territory can have a voice, the only satisfactory way such rules and regulations can be adopted, and that such rules shall be standing provisions under which the head of the department can act at any moment when occasion occurs and without any delay whatever. No other bill thus far presented does more than provide for quarantine regulations, and such regulations are to be under the entire control of the Marine-Hospital Service. States are to have no voice in the matter, but must submit to the federal government. There are no provisions in any measure presented, except the bill presented by the AMERICAN MEDICAL ASSOCIATION and approved by the American Public Health Association at its last meeting, that provides in any way for internal sanitation, vital statistics, etc., so much needed, and which are far more important than the maritime quarantine provisions, which are but a small part of the needed sanitary legislation in this country. To say that the bill is retrograde seems to the writer to result from a very imperfect understanding of the measure. It is true that the bill as printed contains a number of errors and is more or less ambiguous in its language. A new draft of the bill is being made, and when it is introduced into Congress it will present a clearer meaning and we trust will be less objectionable.

U. O. B. WINGATE, M.D.

Medical Courtesy.

SHELBYVILLE, IND., Jan. 11, 1898.

To the Editor:—I can not agree with you in your answer to R. A. H. on "Medical Courtesy," in the JOURNAL of January 8. My understanding is, and has been for more than forty years, that on this point of medical etiquette the rule is the reverse of that in social life, and for very obvious reasons. When a physician locates in a town, it is his duty to call on members of the regular profession at the earliest convenient time, if he is a regular physician himself. By this action he manifests his intention to continue in the regular profession and wishes to associate with its members.

He may, as is sometimes the case, be changing his location for the purpose of engaging in quackery, and to avoid any embarrassments, he should be left free to indicate his future intentions, which he can do in an emphatic manner by calling only on those of the regular profession.

Very respectfully, W. G. MCFADDEN, M.D.

BOSTON, Jan. 10, 1898.

To the Editor:—In the JOURNAL of January 8, page 104, "Medical Courtesy," I would suggest adding to the answer, but the newcomer should first leave or send his card as an introduction or announcement of his coming.

Respectfully, J. S. W.

ANS.—Amendment is accepted.

PUBLIC HEALTH.

Influenza at Angers.—The French exchanges mention that the hospitals at Angers are full and patients turned away, from an epidemic of influenza.

Hospital Contagion of Typhoid Fever.—A number of instances were related at the meeting of the Paris Soc. Méd. des Hôpitaux in which patients and nurses in the hospitals acquired typhoid fever, presumably from other patients. Stricter precautionary measures were urged upon the attendants and the use of special vessels, etc., for typhoid patients.—*Semaine Méd.*, December 22.

Health in Chicago.—The report for December, 1897, gives the total deaths during the month as 1,790, or 1.10 per 1,000 inhabitants, the rate for December, 1896, being 1.12 per 1,000. Of these 1,790 deaths 361 were persons under 1 year old and 294 from 1 to 5 years. The causes were: Diseases of the nervous

system 260, pneumonia 221, consumption 168, diseases of the heart 135, bronchitis 106, acute intestinal diseases 77, diphtheria and membranous croup 73, cancer 70, typhoid fever 35.

Large Special Grant for the Control of the White Plague in New York City.—The Department of Health of New York City, after petitioning the "City Fathers" for four years for financial support in its efforts to control the spread of consumption, has won a victory. The Board of Estimate and Apportionment has added to the health department budget for 1898 the sum of $60,000 for the management of the tuberculous sick under the supervision of the department. In the argument for this allowance, or fund, it was alleged that one in seven of the deaths of the city was caused by tuberculosis, and that in some tenement districts the rate was one in four; that many hospitals would not receive such cases, and that the hospitals that received them sought to get rid of them as soon as possible. The Seton Hospital at Fordham Heights, which was built especially for consumptives, would receive patients at the rate of $1 a day. Dr. Biggs, the health department bacteriologist and persistent warrior against the white plague, is reported to have stated that it was the purpose of the department to take charge of such patients as could not pay for treatment. He added that there was no longer any doubt that the disease could be stamped out if it could be properly treated and isolated.

Hygiene for Tourists in France.—Dr. G. Morice of Paris, has written a little book on the above subject. He points out the needs of travelers both on the train and at the hotel or auberge, emphasizing cleanliness as the great desideratum. But most important of all, the latrine accommodation should be above reproach. At present the filthiness of hotel privies in France is for the most part excessive. So much so, indeed, that in their Revue the Touring-Club have commenced what they call "La Croisade des W. C." "First nation in the world for touring, roads, and climate," says Dr. Morice in conclusion, "we are not yet within measurable distance of the English, the Americans, or even the Swiss, as regards ordinary comforts in our retiring closets. Then put your shoulders to the wheel, French landlords, and by paying a little attention to hygiene enable your 'Golden Lions' and your 'White Horses' to at length earn the respect of their patrons." According to an anonymous writer on the same subject the people who expectorate promiscuously in railway carriages, omnibuses, etc., are the chief offenders against decency and sanitation. Until women are allowed to dispense with skirts and appear uncriticised in rational costume, says this bold hygienist, they must, when making use of public vehicles continue exposed to the risk of soiling their petticoats with most offensive and dangerous filth. On a journey, women, he says, are generally encumbered with babies and parcels, and it thus becomes impossible for them to attend properly to their drapery when about to take their seats.

The Annual Report of the Chicago Health Department.—In the annual report for the year 1894, a table of the populations, total reported deaths and the death rates per 1,000 of population of all cities in the United States claiming to have population of more than 200,000 inhabitants showed Chicago to have the lowest rate. For the year just closed a similar table is given with the rates for 1894 appended for comparison:

	Claimed Population July 1, 1897.	Death Rate per 1000. 1897.	1894.
New York	1,990,881	19.5	21.0
Chicago	1,619,226	13.5	15.2
Philadelphia	1,214,256	18.8	18.3
Brooklyn	1,140,000	18.2	20.1
St. Louis	600,000	15.9	16.1
Boston	576,305	21.5	22.9
Baltimore	506,398	18.5	19.1
Cincinnati	500,000	14.3	18.3
San Francisco	360,000	17.1	18.8
Buffalo	360,000	12.5	16.7
Cleveland	350,000	14.2	15.8
Pittsburg	287,500	16.5	18.2
Washington	278,000	19.8	20.2
Detroit	275,000	15.0	15.5
Milwaukee	275,000	13.1	15.7
New Orleans	270,000	25.3	24.9

This is a most satisfactory showing of generally improved public health throughout the country during the past three years—Philadelphia and New Orleans only showing no reduction of mortality. The rate of Chicago, 13.46 per cent. per 1000 is the lowest mortality rate ever recorded, so far as is known, for any city of more than 500,000 inhabitants, either in this country or in any other.

The principal reduction, and the one most gratifying is that in the deaths of infants and young children—fewer by 12 per cent. among the former, and by 12.5 per cent. among the latter, than during the previous year. Since there was nothing in the condition of the weather to account for this, it is only fair to attribute this saving of infant and child life chiefly to steadily improving sanitary conditions.

The result of this growing improvement is also seen in the marked diminution of deaths from the preventable diseases generally—diphtheria, typhoid fever, consumption, etc. The sanitary quality of the water-supply has averaged distinctly better than in 1896. To this better quality is largely due the reduction in the mortality from typhoid fever and the other impure water diseases. Some share of this reduction is undoubtedly due to the increasing care exercised by the public in the use of the hydrant water when it is found to be polluted. The daily laboratory examinations and the warnings based thereon are known to cause many persons to resort to boiling, or some other means of purification when the water is announced by the daily press to be "suspicious" or "bad." Fewer deaths from diphtheria have occurred during the year than in any other since 1884. Antitoxin in the treatment of diphtheria is probably used more freely and successfully by Chicago physicians than by any similar body of the medical profession elsewhere in the world. To their general, prompt and scientific employment of the remedy is to be ascribed the wonderful reduction in diphtheria mortality from an average of 35 per cent. prior to its introduction to 6.6 per cent. in nearly 4,000 cases coming under the direct observation of the Department. The inception of the antitoxin treatment of diphtheria by the Chicago Department of Health dates from the importation by the Commissioner in the fall of 1893 of 100 vials of the Behring serum. The remedy is now made available to physicians at a greatly reduced price and the Department further supplements their labors in the treatment of diphtheria by maintaining upward of a hundred antitoxin stations throughout the city for sub-laboratories for prompt bacteriologic diagnosis, and a corps of experts for assistance in various ways. In the laboratory 26,028 chemic and 3,919 bacteriologic examinations were made. Out of upward of 23,000 samples of milk and cream collected by the inspectors and analyzed in the laboratory, only 1,080 or 4.7 per cent. were found below grade. Through the inspections of the sources of the city's ice supply, including analysis of the waters of the ice fields, and the strict control of the disposition of impure ice made practicable under the permit system, there has been a great improvement in the quality of ice furnished for domestic use, and it is now almost impossible to deliver impure ice for domestic use without prompt detection. The Department meat inspectors have condemned approximately 2,000,000 pounds of meat as unfit for food, and supervised its destruction. Inspection of groceries and general food supplies has become a regular part of the laboratory work. The list now includes almost every variety of food products. Total mortality and mortality from principal causes during 1897 (compared with 1896): Total for 1897: All causes, 21,809; deaths under 1 year, 5,735; deaths from 1 to 5 years, 2,811; diseases of nervous system, 2,787; consumption, 2,180; pneumonia, 2,152; acute intestinal diseases, 1,386; violence, 1,410; diseases of the heart, 1,365; infantile diarrhea, 1,085; bronchitis, 1,026; diphtheria, 702; nephritis, 937; typhoid fever, 437; cancer, 773; other zymotic diseases, 542; other tuberculous diseases, 394; croup, 72; scarlet fever, 81. Total for 1896: All causes, 23,257; deaths under 1 year, 6,512; deaths from 1 to 5 years, 3,201; diseases of nervous system, 3,018; consumption, 2,310; pneumonia, 2,141; acute intestinal diseases, 1,859; violence, 1,362; diseases of the heart, 1,231; infantile diarrhea, 1,202; bronchitis, 1,165; diphtheria, 956; nephritis, 818; typhoid fever, 751; cancer, 734; other zymotic diseases, 517; other tuberculous diseases, 357; croup, 142; scarlet fever, 54.

ASSOCIATION NEWS.

The Senn Medal.—Those members of the AMERICAN MEDICAL ASSOCIATION intending to compete for the medal offered by Dr. Senn for the best essay on some surgical subject, are requested to forward the type-written copies of contributions before March 1, 1898. Address,

J. MCFADDEN GASTON, M.D., Chairman, Atlanta, Ga.

SOCIETY NEWS.

The Medical Society of the State of New York will hold its ninety-second annual meeting in the City Hall, Albany, N. Y., January 25, 26 and 27. The provisional program presents titles of thirty-nine papers.

Iowa State Medical Society.—The forty-seventh annual meeting of the Iowa State Medical Society will be held in Des Moines, Iowa, May 18, 19 and 20. The president is Dr. Edward Hornibrook of Cherokee; the secretary, Dr. James W. Cokenower of Des Moines.

Obstetrical Society of Cincinnati.—The Society, at its annual election, chose the following officers: President, E. S. McKee; vice-president, W. D. Porter; recording secretary, Wm. Gillespie; corresponding secretary, M. A. Tate; treasurer, Geo. E. Jones; librarian, Dr. Bonnifield.

Milwaukee Medical Society.—At the annual meeting of the Milwaukee Medical Society, recently held, the following officers were elected for the ensuing year: President, F. E. Walbridge; first vice-president, A. I. Comfort; second vice-president, John Madden; secretary, Gilbert E. Seaman; treasurer, U. O. B. Wingate; librarian, Louis F. Frank; curator, Arthur J. Patek.

MISCELLANY.

Action of Saliva on Bacteria.—Triolo states that filtered saliva has no bactericidal power, but that fresh sterile saliva will kill all the germs of staphyl. aureus, the bacteria of the air, of diphtheria, typhus, etc., in five day cultures, and greatly reduce their numbers in eighteen hour cultures.—*Gaz. d. Osp. e. d. Clin.*, December 12.

Anti-depopulation Measures.—A project has been presented to the French legislature that girl-mothers convicted of infanticide should be sent to some specially created colony and "condemned to one, two or three years according to the degree of criminality." His Excellency the Minister of the Interior is said to have taken the matter under advisement.

New Hints for Radiography.—Marcus states that iodoform, vaselin and iodoformed ether introduced into deep cold abscesses, form a mixture with the contents of the abscess impermeable to the Roentgen ray. Also that insufflation of air into hollow organs renders them perfectly transparent to the ray, which fact can be utilized in obtaining information in regard to the stomach, or the intestines insufflated from below, as they leave a blank space on the plate.—*Presse Méd.*, November 27.

Wanted.—We desire to secure a copy of No. 8, Vol. 21, of the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION for completion of above volume for a State Board of Health Library. Any of our readers having a duplicate of this number will confer a favor by returning same to this office and we will remit charges on same.

Necropsy of a Case of Pure Verbal Deafness.—For four years the patient's only symptoms were the typic verbal deafness (inability to understand spoken words or to write from dictation), progressing then into sensory aphasia and death four years later. A double and symmetric poly-encephalitis was discovered in the temporal lobes, reduced one-half in size, diminishing in intensity from above downward and from the front backward. This was the only lesion and is the only case on record in which the lesion was purely cellular.—*Semaine Méd.*, December 22.

Nature of the Alterations in the Spinal Cord in Tabes.—Darkschewitch considers that the present status of our knowledge conflicts with the assumption that tabes is due to a primary affection of the cord. He attributes it to a preceding affection of the peripheral nervous system of apparently varying character and varying localization. The alterations in the posterior column appears as the consequence of at least two morbid processes, a polyneuritis and a pachymeningitis in the ramification region of the art. spin. post. The affection of the lateral ventricles is apparently only the result of a polyneuritis.—Moscow Congress, *Wien. klin. Rundschau*, December 12.

Live Frogs as an Antithermic.—An English practitioner of Constanta, Roumania, writes: On the evening of October 19, I was called to visit a Roumanian boy, 6 years old, suffering from typhoid fever. I found him *in extremis*, almost pulseless. The child's head was completely wrapped over with a large white sheet, and as I looked at it this enormous white envelope seemed to be on the move and while I was surveying this covering there crept from under it a small frog, which quietly sat over the child's left arm. It seemed quite content. I immediately called the mother's attention to it and requested her to take the animal away, thinking it had crept there as an intruder. "Oh, no!" said the old lady, "a doctor recommended that a lot of them should be kept to the head to keep it cool." Seeing the head covering still on the move, I raised it for curiosity, and in a second out jumped about twenty other frogs and hopped away in all directions. I have often heard the expression "as cold as a frog," but this was the first time I had seen a frog applied as a head-cooler.—London *Lancet*.

The Address in Surgery Before the British Medical Association.—According to an editorial writer in the *British Medical Journal*, the recent presidential address of Mr. Mitchell Banks has fallen in divers errors about Ambroise Paré, errors that have been exploited beyond repair. That writer says, "Mr. Banks will need to reconstruct his account of Paré. For all that Malgaigne says about it, the date of Paré's birth was 1509 or 1510, not 1517; nor did he 'lead an incessantly active life,' in the ordinary sense of the words, for the first few years after he was born. It is not probable that the Verdum story is genuine; there was no battle or siege of Rheims or of La Fère; he went to Dreux the day after the battle; and we do not know that he was at Saint Quentin or at Moncontour, or that he attended Charles IX. in his last illness. He did not write to his wife for ransom after the fall of Hesdin; it was M. Goguier who wrote. He did not 'invent the ligature,' and never said that he did; he only invented the use of it in amputations; and he did not take for his motto that favorite saying of his *Je le pansay, Dieu le guarist*; the motto he chose for his own portrait in his books was *Labor improbus omnia vincit*."

The General and Special Hospitals of London.—A statistical statement issued by the Hospital Reform Association shows that in London the general hospitals have 5,349 beds, the special hospitals 3,475, and cottage hospitals 299, making a total of 9,123. The in-patients treated in one year were 62,774 in the general hospitals and 27,701 in the special. In the same year the general hospitals treated 897,389 out-patients and the special 439,338. Among the general hospitals the largest number of in-patients appertains to the London, where they amounted to 10,559; at St. Bartholomew's they were 7,290, at Guy's 6,326, and at St. Thomas' 5,493. St. Bartholomew's appears with the largest number of out-patients, 161,419. The special hospitals include five for diseases of the eye. For diseases of the throat, ear and nose there are six hospitals. There are five hospitals for diseases of the skin, six hospitals for diseases of the chest. The Hospital for Consumption has 320 beds and treated 1,851 in-patients during the year, the out-patients being 13,750. There are three orthopedic hospitals. For incurable diseases there are twelve institutions, having 611 beds, while the in-patients were 839, no out-patients being attended by these institutions. Hospitals for diseases of the nervous system are three in number. There are six hospitals for diseases of women and eleven for diseases of children. There are also six lying-in

hospitals and the hospital for cancer. Concerning the latter, the Middlesex Hospital has thirty-five beds set apart for the treatment of cancer, the patients being allowed to remain until they die.

The Toxin of the Gonococcus.—The *Annales de l'Institut Pasteur* for August, 1897, contain the results of an interesting series of experiments with the toxin of the gonococcus. It produces local and general phenomena, injected experimentally, with pronounced phlogogenic properties if injected into the eye or the pleura of the rabbit, while no effect follows its application on the mucous membrane of the conjunctiva or urethra. On the other hand, it produces in man a decided reaction in the urethra, transient but acute while it lasts. The urethra is not immunized by the process, as the same experience was repeated five times in succession. This reaction of the human urethra is special to the gonococcus toxin. Other toxins tested failed to produce any such result. Certain facts indicate that the toxin is located in the body of the coccus and liberated as it dies. It will stand heat to 70 degrees C., and is precipitated by alcohol. Attempts at immunization were successful with rabbits and goats. The serum of goats injected with increasing amounts of the toxin during the course of a year, rendered rabbits immune to the phlogogenic action of the toxin, which can then be injected into the eye and pleura without reaction. These facts have not yet been applied to therapeutics, but de Christmas hopes to obtain in time a serum powerful enough to arrest the progress of local gonorrhea and affect favorably the general phenomena caused by its toxin.—*Presse Méd.*, November 27.

Temporary Gastrostomy for Cicatricial Stricture of Esophagus.—Villard, in reporting a case of the above character, expresses the opinion that we must not consider gastrostomy as a definitive procedure, but rather as a temporary measure, to give the operator time to adapt his means to his case, and to give rest to the esophagus, thereby suppressing the spasmodic and inflammatory condition of that organ and allowing the surgeon to resume the necessarily suspended catheterization. The following observation confirms these views: A woman, aged 45 years, had a cicatricial stricture for the past four years, due to ingestion of sulphuric acid. Regularly catheterized, this woman was fed through the esophagus until June, 1897, when, from unskilful catheterization, deglutition even of liquids became impossible. This woman, after ten days of absolute diet, was in a very bad general condition, weighing only thirty-nine kilograms—about seventy-eight pounds. Villard then performed gastrostomy in two sittings, and for nine days the patient was fed through the stomach. Esophageal catheterization then became again possible, as well as deglutition of liquids. From this on, regular dilatation of the esophagus was performed. Two months after, an operation was done to obliterate gastric fistula; autoplasty with three planes of suture; an insignificant fistulette, persisting for some time; complete cure in November; the patient had then gained eleven kilograms. At present she is fed by the mouth regularly and catheterized from time to time, so as to maintain the caliber of the esophagus. This is not, however, a unique case. In a report by Lefort, comprising sixteen patients, thirteen recovered, with a permeable esophagus after gastrostomy; and in one case of Jabouley of Lyons, gastrostomy performed almost *in extremis* enabled esophageal catheterization twenty days after, with a complete subsequent cure.—*Lyon Médical.*

Medico-Literary Notes.—A governmental report by Sir Richard Thorne, M.D., and Dr. Copeman, on the new preparations of bovine lymph, has been issued by the Local Government Board.

A Linnæus wanted in chemistry—Some change must soon be made in chemic nomenclature or a large portion of a lecture on chemistry will be occupied in articulating the name of the subject which it is proposed to discuss. In a late number of the Comptes Rendus, MM. A. Haller and A. Guyot describe a new substance they have obtained which has the portentous title of the "tétramethyldiamidodiphenyldianthranoltetramethylédiamidé symmetrical with the correspondent oxanthranol." This, we think, would be hard to beat even amongst German sesquipedalian words. The chemists want a Linnæus.

Hirschwald's Medical Directory for 1898.—According to the directory the number of medical men in the German empire is 24,393, of whom 14,582 practice in Prussia, 2,612 in Bavaria, 1,785 in Saxony, 977 in Baden, 826 in Wurtemberg, 702 in Alsace-Lorraine. Of the large towns Berlin has 2,148 medical men, Munich 510, Hamburg 496, Breslau 432, Leipzig 379, Dresden 360, Frankfort 288, and Hanover 218. Of the members of the profession residing in Berlin one qualified in 1830, one in 1841, two in 1842, two in 1843, and four in 1844, of whom Professor Virchow is one. The proportion of medical men to the population is 463 per 10,000 throughout the whole empire and 12.81 in Berlin.

"*The Scholar in Medicine.*"—Dr. George Foy, of Dublin, has made a partial list, as he terms it, of the eminent names of medico-literary men who were natives of the British Isles: John Arbuthnot, author of "Scribilerius;" Wm. Barrington of Coleraine, founder of the Geological Society; Thomas Beddoes, the linguist; John Bell, whose work on Italy justifies his inclusion; J. Berkenhout of Leeds, author of the "Outlines of the Natural History of Great Britain and Ireland;" Wm. Black of Belfast, author of the "Geyser and Rikam Springs in Iceland;" George Cheyne, author of "Physiological Principles of Natural Religion;" Erasmus Darwin, author of the "Phylologia;" Samuel Garth, translator of Ovid's "Metamorphoses;" Francis Glisson, the Aristotelian scholar; Samuel Gmelin, the scientist; Oliver Goldsmith, (?) the poet; John Gerarde, the traveler and botanist; John Mason Good, the translator of "Lucretius;" William Musgrave, the antiquarian; Mungo Park, the African explorer; Thomas Percival, founder of the Manchester Philosophical Society; Sir Wm. Petty, author of the "Political Anatomy of Ireland;" Archibald Pitcairne, the mathematician; John Radcliffe, founder of the Radcliffe Library; Sir William Wilde, author of the "Valley of the Boyne;" William Withering, the mineralogist; John Wolcott, the satirist; William Woodville, author of the "Medical Botany;" Robert William, the antiquarian. Will not some of our readers undertake to compile a similar list for this Western world?

Arthurian Medicine.—Dr. G. M. Gould and W. L. Pyle have collaborated, for the Johns Hopkins Hospital Historical Club, a sketch of the medicine and surgery of King Arthur's time and of how the Knights of the Round Table fared after their many warrings and woundings. There is no mention in the Arthurian writings of a court physician. The sick and wounded were often taken to the nunneries, monasteries and to the abode of some hermit. Salves and ointments were used in the treatment of wounds, and the Sangrail was effective both for wounds and sicknesses. The bath medicated with herbs and phlebotomy were not unknown. Not only the religious inmates of nunneries but the noble women elsewhere undertook the dressing of wounds. The queen "la belle Isoud" was spoken of as "the noble surgeon."

The century birthday of a Scottish medical poet.—January 5, the birthday of Dr. David Macbeth Moir, the medical poet, whose birthplace was Musselburgh, Scotland, was set apart by many literary and scientific men to commemorate the beloved physician of their section, by the founding of a scholarship. Dr. Moir's sonnet on "The Hospice of Saint Bernard" is the writing especially noted as containing the spirit and warmth of a "medical poet." "Delta," as he signed himself in some of his writings, was born in 1798 and died in 1851.

The Pirogoff memorial: Billroth's sentiment.—The museum of anatomy and surgery recently built to the memory of Pirogoff and to be called the Pirogoff Museum was opened in St. Petersburg on Sunday, October 26 (old style). The total funds collected for the memorial were 115,000 roubles and the building has cost 85,000 roubles (about £9,000). The opening

ceremony was attended by the Prince and Princess of Oldenburg and a large number of other distinguished guests. It is not generally known that the famous Viennese surgeon Billroth was a great admirer of Pirogoff, but that this was the fact is attested by the interesting sentiment or endorsement, made by the former when presenting his picture to his friend and patient Pirogoff, that runs as follows: "To the honored Master, Nicholas Pirogoff. Truth and clearness in thought and in feeling, as well as in word and deed, are the steps on the ladder which lead men up to a seat with the gods. To follow your guidance, equally courageous and sure, on this path, which is not without its dangers, is my earnest intention. Your sincere admirer and friend, Billroth." In writing to a Russian surgeon regarding the fatal malady of Pirogoff, a palatal neoplasm, he refused to operate or to advise an operation, saying "I am not that bold operator whom you knew years ago in Zurich. Before deciding on the necessity for an operation, I always propose to myself this question, Would you permit such an operation as you intend performing on your patient to be done on yourself? Years and experience bring in their train a certain degree of hesitancy (Zurückhaltung). Every year brings out clearer and clearer the shortcomings of our art."

The last of the Valois and his assassin.—Recently some interesting facts have been made known in regard to the assassination of King Henry of Valois, at St. Cloud, Aug. 1, 1589. It would appear that the king was slain by a man who was, like himself, intensely neurotic. Henry III. is one of the best known historic bad characters. His face was small and unsymmetric; his tastes varied between violent exercise in the worst weather and the effeminate coddling of himself in midsummer. Abject superstition made him walk barefoot at the head of a procession, and a few days later he would delight in swearing complicated oaths with intent to insure his final reprobation. He rouged his face, and wore kid gloves in bed to keep his hands white, and was subject to the worst perversions of instinct. But Jacques Clement, his assassin, was also, it would appear, a being who lived on the borderland of crime and insanity. The religious monomania, undeniably the immediate cause of the crime, followed a life of license alternated with extreme mortification of the flesh. It was said at the time that a court ecclesiastic had hocussed him to cause him to dream, and to fancy that he heard voices. The truth is that his mind, weakened by vice and bigotry, was thoroughly unhinged by the horrors of the religious wars of his time, and he sincerely believed that heaven had ordered him to slay a man who, both from a medical and a moral point of view, was his perfect counterpart. Acting on that belief Clement made history by extinguishing the line of the Valois. —*British Medical Journal.*

Washington.

MEDICAL SOCIETY ELECTION.—At the annual meeting of the Medical Society recently held, the election of officers resulted as follows: President, Dr. Samuel C. Busey; vice-presidents, Drs. Charles W. Richardson and G. M. Kober; corresponding secretary, Dr. Thomas C. Smith; recording secretary, Dr. Samuel C. Adams; treasurer, Dr. C. W. Franzoni; librarian, E. L. Morgan; censors, Drs. C. W. Richardson, Winter, French, Kleinschmidt and Acker. Dr. Busey was president of the Society some years ago, and this election gives him the office for the sixth term, five of which have been consecutive. Dr. Franzoni was re-elected to serve his twenty-sixth term as treasurer, and Dr. Adams was re-elected to serve a ninth term as recording secretary. At this, one of the largest attended meetings in the history of the Society, the almost unanimous election of these officers is a fitting testimonial of their fidelity to duty and the recognition of their valuable services. Dr. Robbins read a paper entitled "Dangers of the Barber Shop;" Dr. Snyder, "Abscess of Gall-bladder with Typhoid Ulcers;" and Dr. J. Taber Johnson reported two cases of hysterectomy, with specimens.

WASHINGTON OBSTETRICAL AND GYNECOLOGICAL SOCIETY.—The 273d meeting of the Society was held at the residence of Dr. Bromwell, at which Dr. W. S. Bowen read a valuable paper on "Ventral Hernia."

CENTRAL DISPENSARY AND EMERGENCY HOSPITAL.—At the recent meeting of the directors of the hospital, the following report for the month of December was read: New cases, 726; total number of visits, 2,174; number of deaths, 1; number of operations, 155; ward patients, 37; number of prescriptions, 2,351; ambulance calls, 45. The directors decided to have the annual donation day February 16, at which time donations of money, clothing, medical supplies and instruments will be gratefully received. The list of donations and donors will appear in the public press.

CHANGE OF ADDRESS.

Baker, L. H., from Oak Park, Ill., to Fitzgerald, Ga.
Capp, W. M., from 2211 Spruce Street to 123 N. 11th Street, Philadelphia.
Eichberg, L. R., from 211 E. 62d Street, to 225 W. 106th Street, New York.
Formaneck, F., from 251 Ogden Avenue, to 803 Warren Avenue, Chicago; Fite, C. C., from 102 W. 93d Street to 1 Madison Square, New York, N. Y.; Frank, C. P., from 77 E. High Street to 167 E. High Street, Detroit, Mich.
Hoffman, F. N. A., from Evanston to Stewardson, Ill.
McDaniel, E. D., from Camden to Coy, Ala.; Motter, M. G., from 30th and U Streets, N. W. to 2114 Connecticut Avenue, N. W. Washington, D. C.
Nahensky, H., from 165 Hudson Avenue to 23 Erving Place, Chicago; Nolder, S. M., from Fairmount, Ind., to 500½ Main Street, Newton, Kas.
Proctor, C. M., from Helene to White Selphur Springs, Mont.
Stewart, H. J., from 105 S. Campbell Avenue to 2118 W. Lake Street, Chicago.
Thomas, C. H., from Philadelphia, Pa., to Dansville, N. Y..; Tomlin, W. S., from North and Illinois to 48 W. North Street, Indianapolis, Ind.
Van Hood, E., from Ocala, Fla., to 214 E. 34th Street, New York City.

LETTERS RECEIVED.

Allport, Frank, Chicago, Ill.; Allen, J. B., Cambridge City, Ind.; American Sports Publishing Co., New York, N. Y.
Bleazley, L. F., Detroit, Mich.; Baker, L. H., Oak Park, Ill.; Bowcock, C. M., Springfield, Ill.; Busey, S. C., Washington, D. C.; Blaine, J. M., Denver, Colo.; Bishop, Alfred & Sons, Limited, London, Eng.; Bogie, M. A., Kansas City, Mo.; Buttermiller, J. C., Cincinnati, Ohio.
Coughlin, John H., (2) New York, N. Y.; Cleaves. Margaret A., New York, N. Y.; Conner, Robt. E., Hickory, Pa.; Carstens, J. H., Detroit, Mich.; Cotrell, D. D., North Cohocton, N. Y.; Campbell, R. D., Grand Forks, N. D.
Divine, Chas. A., Mt. Vernon, N. Y.; Dower, T. J., Livermore, Ia.; Dutton, C. E., Minneapolis, Minn.; Davis, O. P., Topeka, Kas.
Ensign, W. O., Rutland, Ill.; Edwards, Wm. M., Kalamazoo, Mich.
Fite, C. C. New York, N. Y.; Fox, L. Webster, Philadelphia, Pa.; Fries Brothers, New York, N. Y.; Fischer Chemical Importing Co., New York, N. Y.; Fougera, E. & Co., New York, N. Y.
Guillaudan, W. L., New York, N. Y.; Gustin, Mackie L. V., Attleboro, Mass.; Gay, B. F., Pierce, Neb.; Galloway, D. H., Chicago, Ill.
Horlick's Food Co., Racine, Wis.; Hall & Ruckel, New York, N. Y.; Haubold, H. A., New York, N. Y.; Hummel, A. L., Advertising Agency, New York, N. Y.; Holmes, Bayard, Chicago, Ill.; Huff, S. M., Lamar, Pa.; Harriman, W. E., Ames, Iowa; Hardy, Neal, Massillion, Ohio.
Ingals, E. Fletcher, Chicago, Ill.
Jayne, W. A., Denver, Colo.; Jeffers, G. D., Cunningham, Kas.; Jones, Hamilton, P., New Orleans, La.; Justice, J. D., Quincy, Ill.
King, A. D., Des Moines, Iowa.
Lehn & Fink, New York, N. Y.; Library of Congress, Washington, D. C.; Larned, E. R., Joliet, Ill.; Lambert, Wm. (2), Kansas City, Kas.
Marchand, P. A., Cincinnati, Ohio; Maker, L. E., Sac City, Iowa; Motter, M. G., Washington, D. C.; Molder, S. M., Fairmount, Ind.; Malcolm, J. W., Wynnewood, I. T.; McArthur, J. H., East Barre, Vt.; McNeel, H. W., Mill Point, W. Va.; Macdonald, W. H., Lake Geneva, Wis.
Newell & Heldman, Chicago, Ill.
Oelrichs & Co., New York, N. Y.
Parrish, J. C., Vandalia, Mo.; Pope, Curran, Louisville, Ky.; Porter, G. H., Steamboat Rock, Iowa; Plummer, H., Harrodsburg, Ky.; Pancoast, J. W., Philadelphia, Pa.; Paul Paquin Laboratories, (2) St. Louis, Mo.; Parke Davis & Co., Derroit, Mich.
Ryan, Charles, Springfield, Ill.; Root, H. A., Toledo, Ohio; Reed R. H., Asheville, N. C.
Sternberg Geo., Washington, D. C.; Sewanee Medical College, Sewanee, Tenn.; Scheel, E. E., Bloomington, Ill.; Schultz, E. F., Milwaukee, Wis.; Stanton, Dr. Grand Rapids, Mich.; Shoemaker, John V., Philadelphia, Pa.; Smith, M. M., Cedar Chapel, Tenn.; Smith, Gould, Taylorville, Ill.; Schick, G., Los Angeles, Cal.; Sanborn, E. A., Somerville, Kas.; Smith, D. D., New Richland, Minn.; Stearns & Co., Detroit, Mich.
Thorp, C., Denver, Colo.; Thorington, J., Philadelphia, Pa.
Wyeth, Jno. & Bro., Philadelphia, Pa.; Weir, S. D., Terre Haute, Ind.; Weidman, W. Murray, Reading, Pa.; White Rock Mineral Spring Co. Waukesha, Wis.; Wall, G. A., Alburquerque, N. M.; Wray, W. E., Waupun, Wis.
Zeit, F. R., Chicago, Ill.

THE PUBLIC SERVICES.

Army Changes. Official List of Changes in the Stations and duties of officers serving in the Medical Department, U. S. Army, from January 8 to 14, 1898.

Major Egon A. Koerper, Surgeon (Ft. Crook, Neb.), leave of absence granted is extended two months.

Lieut.-Col. David L. Huntington, Deputy Surgeon-General (Surgeon-General's office, Washington, D. C.), is granted leave of absence from or about Feb. 1 to April 10, 1898.

Capt. Peter R. Egan, Asst. Surgeon, is relieved from duty at Ft. Hamilton, N. Y., and assigned to duty at Ft. Hancock and the Sandy Hook Proving Ground, N. J., with station in New York City, and will make daily visits to and between those points until he shall be furnished with suitable quarters at Ft. Hancock.

Col. Dallas Bache, Asst. Surgeon-General, will be relieved from duty as chief surgeon, Dept. of the Platte, on Jan. 20, 1898, and will repair to Washington, D. C., and report in person to the Surgeon General of the Army, to assume charge of the museum and library division of his office, to enter upon duty April 10, 1898, as professor of military medicine in the Army medical school, to which he is assigned accordingly.

Navy Changes. Changes in the Medical Corps of the U. S. Navy for the week ending January 15, 1898.

Medical Director B. H. Kidder, detached from duty with the medical examining board, Washington, January 21, and ordered home on waiting orders.

Medical Director B. H. Kidder, retired January 23.

P. A. Surgeon A. W. Dunbar, detached from the "Vermont" and ordered to the "Nashville" January 15; on arrival of the "Nashville" on the European station ordered to the "San Francisco."